

JUNE
1961

COMMERCIAL FERTILIZER

and PLANT FOOD INDUSTRY

**NEW MAP SHOWS
WHICH COUNTIES BUY
THE MOST FERTILIZER
Get Your FREE Copy**

SEE PAGE 19



Sooner or Later
You'll be Packaging
Your Fertilizer in

50!
POUND
BAGS!

Sooner or Later You'll be Wanting **THE KRAFTPACKER**

**AUTOMATIC OPEN MOUTH BAG FILLING MACHINE
WITH 4 OZ. + OR — ACCURACY UP TO 25 BAGS PER MIN.
FOR AN AVERAGE OF OVER 400 TONS PER 8-HOUR DAY**

Why not investigate it NOW?

The Kraftpacker has a 5 year record of consistently true accuracy and high production with all types of fertilizers under all bagging conditions in 31 states and several foreign countries.

Models to accommodate 25 lb. to 100 lb. weights and from 50 lb. to 200 lb.

We'll send you a brochure, of course — Write Dept. F61 ...but we'll also arrange for a free demonstration nearby!

If your product can be packaged in a multiwall bag — we'll make the Kraftpacker to fill your bags — and we'll make the bags to fit your product! Our new 300,000 sq. ft. bag plant, close to our integrated paper mill, is equipped to produce every kind of multiwall bag used in fertilizer packaging.

Exclusive Sales Agents

The **KRAFT BAG** Div.
of St. Marys Kraft Corp., Subsidiary of
GILMAN PAPER COMPANY

111 WEST 50th STREET, NEW YORK 20, N. Y.
400 W. MADISON ST., CHICAGO 6, ILLINOIS



- ☐ We are interested in your Kraftpacker.
- ☐ We are interested in improving our bag.

COMPANY NAME _____

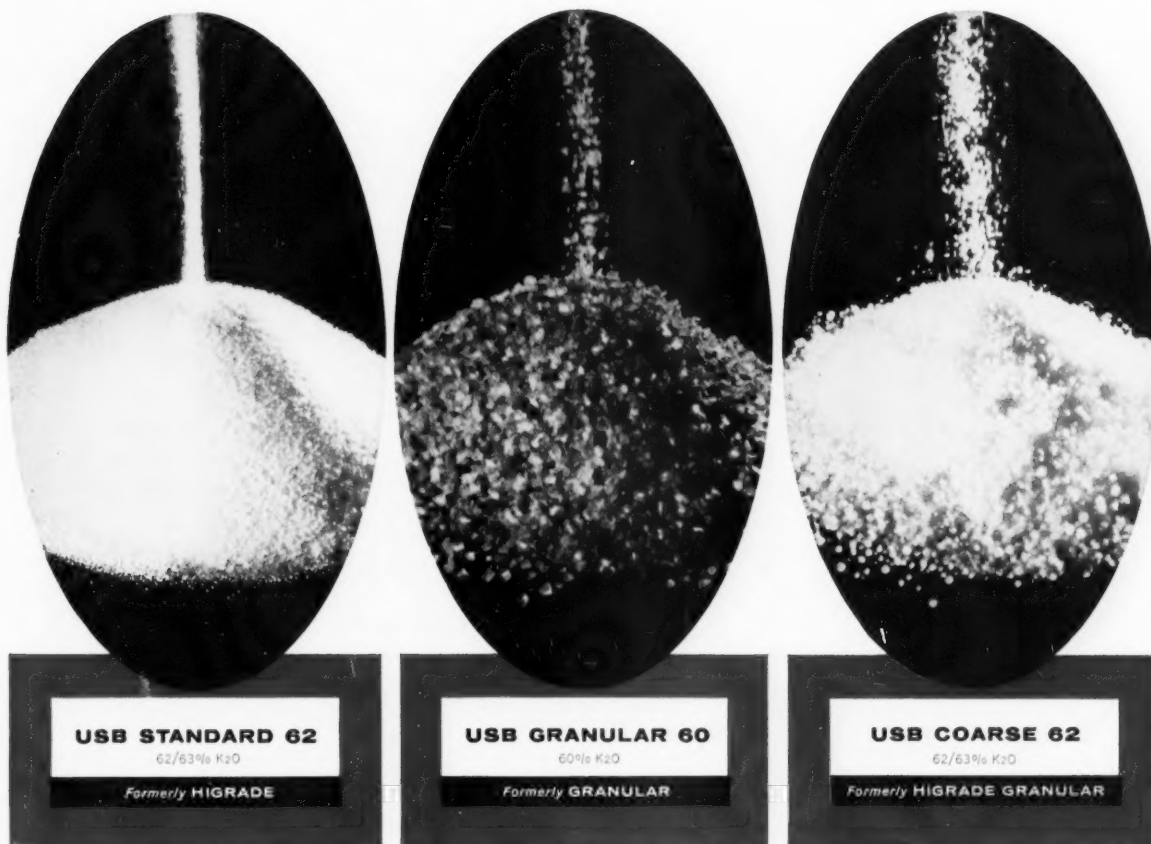
ADDRESS _____

CITY _____ ZONE _____ STATE _____

PRINCIPAL _____

PRODUCT MFD _____

3 types of **POTASH** specially sized for you..



To make the best fertilizers...

Each of our three types of high quality muriate of potash is ideally sized to meet your particular manufacturing requirements. Both of the white grades — STANDARD and COARSE — contain the highest possible K_2O (62/63%) and make feasible the manufacture of the highest analysis mixtures. Our GRANULAR 60 is ideally suited for mixtures requiring muriate of a larger particle size... or for direct application. All three products are refined to assure free-flowing and non-caking properties during handling and storage.

For nearly thirty years our products and services have kept pace with your exacting needs. Call, telex or wire one of our nearby offices for prompt delivery.

ATLANTA
1627 Peachtree St., N.E. / TRinity 6-7515
CHICAGO
3456 Peterson Avenue / INdependence 3-6262
LOS ANGELES
630 Shatto Place / DUnkirk 7-5151


U.S. BORAX

50 ROCKEFELLER PLAZA, NEW YORK 20, N.Y. / JUDson 2-6262

published monthly by
Walter W. Brown Publishing Company, Inc.
 75 Third Street, N. W.
 Atlanta 8, Georgia
 Phone TRinity 4-4160

ERNEST H. ABERNETHY
 President

CLAY W. PENICK, JR.
 Editor and General Manager

BRUCE MORAN
 Associate Editor

V. T. CRENSHAW
 Business Manager

ELON A. ABERNETHY
 Chicago Sales Manager

Subscription rates:
 United States \$3.00 per year; 3 years, \$7.50.
 Canada: \$5.00 per year; 3 years, \$12.00.
 Foreign: \$10.00 per year; 3 years, \$24.00.
 Single copy: current issue, 50 cents;
 back issues, \$1.00.

COMMENTING FREELY

by

Bruce Moran

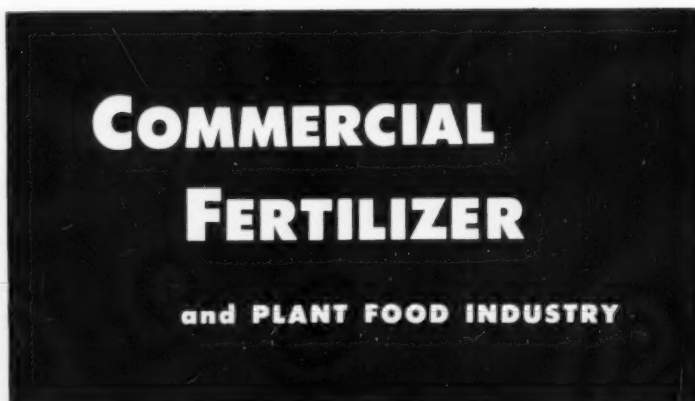
It has been more than fifty years since people first began to realize that this country's natural resources were not inexhaustible. I say "first began to realize" because it was a long, slow process educating them. Teddy Roosevelt, inspired by a great statesman, Gifford Pinchot, launched the educational process. Pinchot knew whereof he spoke, because - after being Governor - he became the first chief of the US Forest Service.

But conservation is not a matter of just not wasting: cutting trees without replanting; draining soil without renewing; letting soil run down the hill with the gullywashers.

Conservation is a broad thing, but one which should be of major interest to our industry because we are so closely associated with the major waste areas of soil and food.

Not too many of us are concerned about it because we have a surplus of almost everything. But if, for example, our water tables should go down much further - we would start to worry, but start too late.

Your business is the land and the people who work the land. So conservation is your problem. Think about it.



Vol. 102, No. 6

June, 1961

Established 1910

contents

special features

Armour breaks ground	28
Price mapping	34
Management seminar	38
Family farms in 1975	51
Who gets the business?	52
Invents specialty applicator	52
Refrigerated ammonia barges	67
Break the yield barrier	68
Fertilizer is power	72

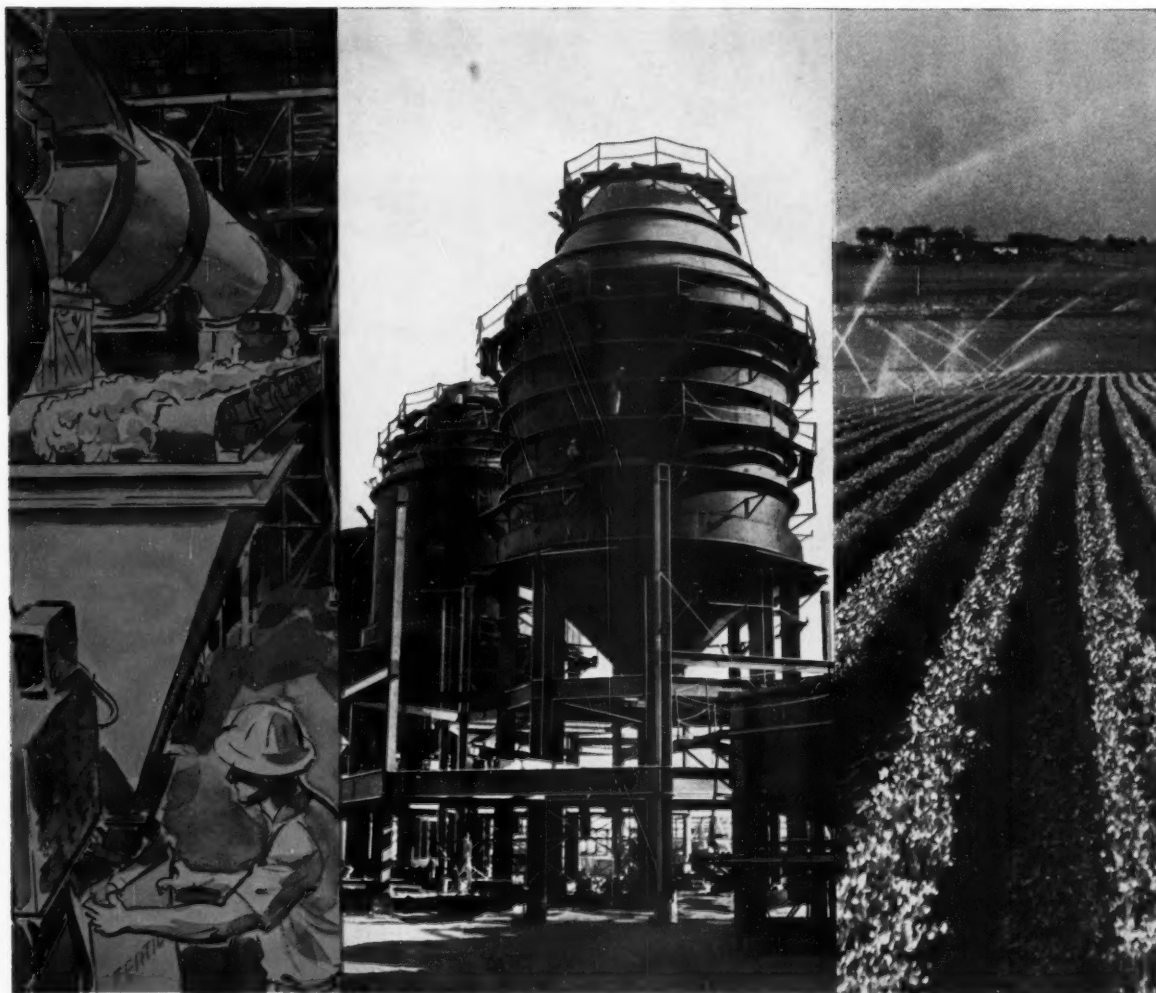
regular departments

Just around the corner	8
Research briefs	23

Association activities

NPFI convention plans	24
Sulphur Institute program	25
Pacific N.W. conference	26
Analytical workshop	64
Meeting calendar	64
Around the map	29
Across the fence	36
People in the industry	42
International scene	46
Changes	48
Of this and that	54
Supplier news	55
Tonnage table	70
Classified advertising	73
Index to advertisers	74

Second-class postage paid at Atlanta, Georgia. COMMERCIAL FERTILIZER and Plant Food Industry is published monthly by Walter W. Brown Publishing Co., Inc., 75 Third St., N. W., Atlanta 8, Georgia.



3-WAY BOOST IN POTASH

**INCREASED PRODUCTION OF TRONA® MURIATE
WILL SOON MEAN BETTER SERVICE...BETTER MIXED
FERTILIZERS...HIGHER YIELDS OF QUALITY CROPS**

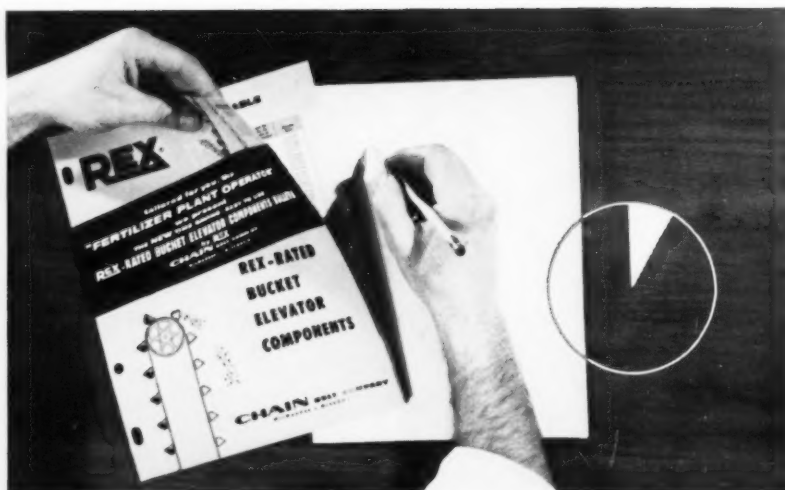
Increased production of Muriate of Potash at Trona will be measured in three-way benefits. Expanded potash facilities, shown above, will soon make available from AP&CC more tonnage of free-flowing, uniform granule size Trona potash in granular and regular grades for agriculture's expanding needs. To the mixer, more quality potash from Trona will mean a better finished product... and to the grower, higher yields of quality crops.

TRONA *American Potash & Chemical Corporation*

3000 W. SIXTH STREET, LOS ANGELES 54, CALIFORNIA
99 Park Ave., New York 16, N.Y.

Other Sales Offices: Chicago • San Francisco • Portland (Ore.) • Atlanta • Columbus (O.) • Shreveport

**NOW
SELECT
BUCKET
ELEVATOR
COMPONENTS
IN
LESS
THAN
FIVE
MINUTES**



**New Rex Selection Tables condense 70 years'
experience into a simple 5-minute guide**

Here's the fertilizer industry's quickest, simplest way to select the correct components for your bucket elevators.

It's not only fast—it's accurate; it's easy! In a few simple steps it leads you to the equipment that will meet your specific service requirements most economically: chains, buckets, sprockets, bearings and take-ups.

All you have to know are the type of material you are handling and your required volume and lifting height. You just feed this basic information into the Rex Selection Tables. Here your requirements are fully analyzed—and out come your selections, clear and correct.

Rex Selection Tables are contained in the new Rex Rated Bucket Elevator Components Bulletin No. 6057. Send for your free copy today.

CHAIN Belt Company, 4706 W. Greenfield Ave., Milwaukee 1, Wis. (In Canada: Rex Chainbelt (Canada) Ltd., Toronto and Montreal)

REX®
CHAIN BELT COMPANY

Please send my free copy of the Rex Rated Bucket Elevator Components Bulletin No. 6057, containing the Rex Selection Tables for selecting elevator components.

Name _____ Company _____

Address _____

City _____ Zone _____ State _____

Agricultural insight creates...

new dimensions in service from Sohio



"We're serious about *service*" is far more than just a slogan at Sohio, supplier of nitrogen materials for the fertilizer industry. It's a genuine feeling of responsibility to serve your nitrogen needs as completely and as efficiently as we know how.

One vital aspect of Sohio service is *planning ahead* . . . developing improved nitrogen materials, improving services and supporting activities that will

benefit the entire fertilizer industry.

In 5 short years at Sohio, this agricultural insight to the needs of the fertilizer manufacturers has led to the development of:

- New solutions with higher nitrogen content . . . less water.
- Higher fixed-to-free ratio solutions.
- Addition of optimum amounts of urea to lower saturation temperatures.

- Solutions adapted to preneutralization.
- Technical assistance and service in using more solutions in making fertilizers.

For more about Sohio service and products, call the "Man from Sohio." He's your link with Sohio's full line of quality nitrogen materials: anhydrous ammonia . . . aqua ammonia . . . coated 45% or uncoated 46% urea . . . 18 nitrogen solutions, including all urea types.



... we're serious about *SERVICE* at Sohio
SOHIO CHEMICAL COMPANY
Agent for Solar Nitrogen Chemicals, Inc.

Fort Amanda Rd., P.O. Box 628 • Lima, Ohio
Phone CApitol 5-8015 or wire (TWX) call letters LIMA 0 497-U)

A-10



JUST AROUND THE CORNER

By Vernon Mount



THE RETURN to conventional diplomacy was brief. Perhaps it is now a thing of the past. Only time, and the climate of Vienna June 3-4, can tell. At any rate, as someone has said, the New Frontier keeps the show on the road.

BUT NOTE this change of technique: The new approach is informal in the extreme. No solemn seats around a conference table. No stuff about Summit. It has been learned that Jovian bolts can still be hurled from summits.

PERHAPS we will develop a new international approach, akin to the one accredited to the knockneed legs which said to each other "You let me by and then I'll let you by." Politics is the art of compromise.

MAYBE statesmanship is, too!

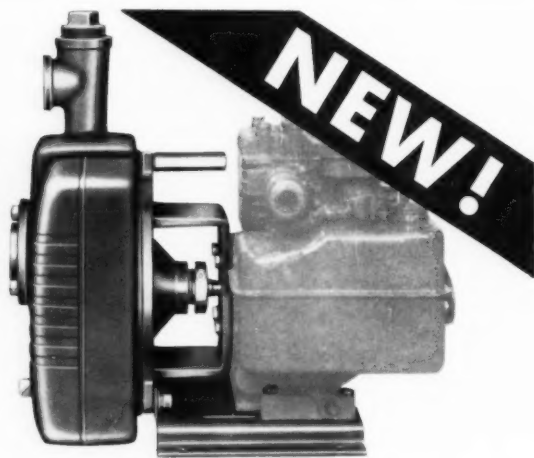
Yours faithfully,

Vernon Mount

BARNES SELF-PRIMING FERTILIZER PUMPS

**YEARS AHEAD DESIGNED
FOR LIQUID FERTILIZERS**

*electric or
gasoline motor
driven models
all cast iron
or all aluminum*



Easily Bolts On To Any Power Source Pumps are not close coupled. Just slide pump onto motor crankshaft, tighten four bolts and a locking collar ... you're ready for action. Shaft locking collar acts as a slinger to prevent fertilizers from entering engine.

Replaceable Volute and Impeller Just remove three nuts and pump volute and impeller are exposed for fast, inexpensive servicing. Replaceable volute nullifies wear factor, eliminates wear plate.

Years Ahead Performance Barnes new self-priming centrifugal pumps have greatly increased capacities and pressures. Up to 120 GPM at 30 ft. of head!

Acid and Abrasive Resistant Materials Barnes new SPC's are made from quality materials selected to resist acids and abrasives. Pump body, impeller, volute and mounting head are either cast iron or aluminum. Pump shafts are solid stainless steel and all Barnes Blue Ribbon pumps feature genuine Buna-N check valves.

WRITE TODAY FOR LITERATURE ON BARNES LIQUID FERTILIZER PUMPS!

**BULK STATIONS • STORAGE
TANKS • TRUCK
TRANSPORTS • NURSE
TANKS • FIELD
APPLICATORS**



BARNES MANUFACTURING CO.
Mansfield, Ohio • Oakland, Calif.

6115



41 plants...for prompt delivery of AA quality products

41 plants of The A.A.C. Co., located in the United States, Cuba and Canada, assure you dependable, fast deliveries of AA quality products for farm and industry. You can schedule your production with confidence... the right quantity and grade will be at your plant when you need it.

*for uniform quality, prompt delivery
and technical service... order from*


The
**American
Agricultural
Chemical**
Company

GENERAL OFFICE: 100 Church Street, New York 7, N.Y.

producers of:

Florida Pebble Phosphate Rock • Superphosphate
AA® QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers • Keystone® Gelatin
Bone Products • Fluosilicates • Ammonium Carbonate
Sulphuric Acid • Phosphoric Acid and Phosphates
Phosphorus and Compounds of Phosphorus





A \$60,000,000 STEP IN ARMOUR'S PROGRAM OF PROGRESS

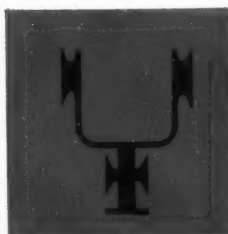
As America's need for more and better fertilizers grows, Armour Agricultural Chemical Company continues to improve its products and expand its facilities. The latest example of Armour's progressive philosophy is its new \$60,000,000 program for increasing its nitrogen and phosphate production facilities. By 1962, new installations will approximately **TRIPLE** Armour's production of these materials. A nitrogen plant will be built near Sheffield, Alabama, and a phosphate plant near Fort Meade, Florida. In addition, facilities for manufacturing mixed fertilizers will be expanded and modernized.

New installations larger facilities and ever-improving technical methods have made Armour the most respected name in the fertilizer industry: a name synonymous with quality and dependability. The Armour Program of Progress is devoted to improving the products and services that have made the Armour "A" a symbol of quality in the fertilizer industry . . . the "BIG A" in agriculture.

31
SALES OFFICES
SERVING THE
FERTILIZER
INDUSTRY

ARMOUR AGRICULTURAL CHEMICAL COMPANY
General Offices, Atlanta, Georgia

SYMBOLS OF PLANT LIFE



In medieval times, the "black art" of alchemy was condemned by superstitious authorities hardly less ignorant of chemistry than the masses. To avoid persecution . . . and possible execution . . . for witchcraft, alchemists invented secret symbols for use in their experiments with potash and other basic elements.

TODAY, EXPERIMENTS ARE STILL BEING MADE WITH POTASH . . . BUT NOW NO SECRETS SURROUND ITS IMPORTANCE IN AGRICULTURE.

FOR THE PRODUCTION OF QUALITY FERTILIZERS, SOUTHWEST POTASH CORPORATION SUPPLIES MIXERS WITH DEPENDABLE HIGH-K[®] MURIATE—IN STANDARD, COARSE AND GRANULAR GRADES.



17th Century Oven and Still

SOUTHWEST POTASH CORPORATION

1270 Avenue of the Americas, New York 20, N.Y.



*A 15th Century Symbol for Cribbled Ashes



Headquarters For ALL Phosphates Used In High Analysis Fertilizers.

YOU GET
ALL THREE
FROM **usPp**



TRIPLE SUPERPHOSPHATE
RUN-OF-PILE / COARSE / GRANULAR



DT-MON[®]
18-46-0



PHOSPHORIC ACID
52-54% P_2O_5

The Country's Largest and most Dependable Source of
Phosphate Products for High Analysis Formulations!



QUALITY PHOSPHATE PRODUCTS

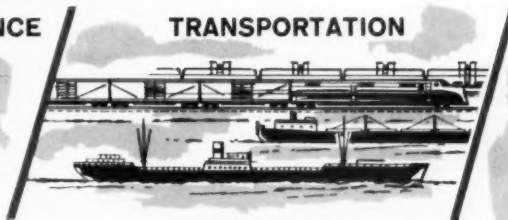
BACKED BY

**A Dependable
Service Program**

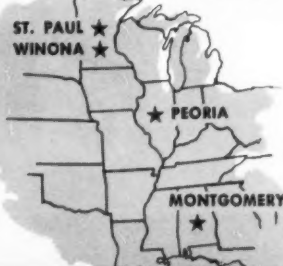
TECHNICAL ASSISTANCE



TRANSPORTATION



WAREHOUSING



For Requirements - Contact Our Sales Agents

BRADLEY & BAKER

155 East 44th Street,
New York 17, New York

Telephone: MUrrayhill 2-5325

U.S. PHOSPHORIC PRODUCTS

TAMPA, FLORIDA

TENNESSEE



CORPORATION



Just Say



That's All

and get both automatically

Continuing research and development assure you of consistently fine quality. Continuing recognition of the industry's need for dependable deliveries assures you of consistently fine service—same day shipment.



**MURIATE OF POTASH
SULPHUR**

Produced by

**DUVAL SULPHUR
&
POTASH COMPANY**

Exclusive Sales Agent

ASHCRAFT-WILKINSON CO.

ATLANTA, GEORGIA

Norfolk, Va. • Charleston, S. C. • Tampa, Fla. • Jackson, Miss. • Columbus, Ohio • Montgomery, Ala. • Des Moines, Iowa

How Union-Camp's 5-Star Plan saved multiwall bag user over \$130,000 a year

Making things the same can sometimes make a whale of a difference. Particularly in a multiwall bagging operation. The Smith-Douglass Company, Inc., of Norfolk, Virginia proved it recently when they put Union-Camp's 5-Star Plan into action. The difference—in annual packaging savings—came to over \$130,000 a year!

Standardize = Economize

Initial 5-Star Plan surveys at Smith-Douglass' six plants revealed that *standardization* held the key to major cost reductions. Three plants used sewn open-mouth multiwall bags. One used sewn valve bags. The remaining two plants used both types of bags.

Union-Camp's multiwall specialists showed that \$30,000 a year could be saved by converting all six plants to sewn open-mouth bags and using open-mouth bag filling machines.



5-Star Plan in action. Plant surveys made by Union-Camp multiwall specialists paved the way for the major packaging savings described here.

That was only the beginning. By carrying the change-over one step further, and standardizing on *size* and *construction* of multiwall bags, the company would save another \$22,000 a year.

1 Design Replaces 160

Next, Union-Camp's survey team analyzed the company's existing bag *designs*. They found there were about 160 designs being used. Here, again, standardization was recommended.

By creating one basic design, eliminating an expensive yellow outer sheet, and using the same printing copy for all bags, the company netted additional economies of \$84,000 a year.

\$30,000 plus \$20,000 plus \$84,000. Total annual packaging savings — \$134,000.



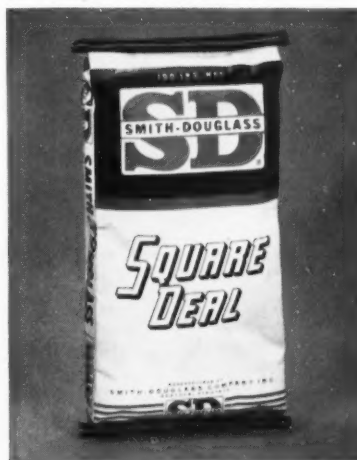
\$30,000 a year savings resulted from converting to sewn open-mouth multiwalls in company's six plants.

How Much Could You Save?

Hundreds of companies—large and small—reduce their multiwall packaging costs by taking advantage of Union-Camp's 5-Star Plan. This comprehensive service is free. It covers

bag design, bag construction, specifications control, packaging machinery and a survey of your materials handling operation. An improvement in any one of these areas conceivably could result in substantial economies for you.

See your local Union-Camp man for complete details.



This basic bag design, now used for all Smith-Douglass brands, reduced company's multiwall costs by \$84,000.

FREE 16-PAGE BOOKLET

Write Dept. M-4 today for a free copy of Union-Camp's new 5-Star Plan booklet. It describes many case histories showing how packers like yourself have achieved greater efficiency and economy in their multiwall packaging operations.

UNION-CAMP®
MULTI WALL BAGS

Union Bag-Camp Paper Corporation 233 Broadway N.Y. 7, N.Y.

More protein—more meat. High-protein grains pay big dividends in faster-growing, fatter cattle and sheep.



Pass this word on to your fertilizer customers...

NITROGEN FERTILIZATION CAN MEAN 30% HIGHER PROTEIN GRAIN... FASTER-GROWING, FATTER CATTLE AND SHEEP

Nitrogen fertilization can increase grain protein content by more than 30% . . . per-acre grain yield by more than 100%. High total crude protein in grains means more beef, lamb and mutton—on less purchased protein feed supplements. Our "Tech-Tips" Bulletin #4 gives full details . . . and Texaco offers 16 Nitrogen solutions for fertilizer manufacture.

Solutions range from 37% to 53% nitrogen content. Sixteen different Nitrogen Solutions—ranging from 37% to 53% nitrogen content—are available at our Lockport, Illinois, plant. Six solutions also contain urea. Delivery is always fast and on-time because of ample loading, switching and transportation facilities.

Technical advisory service available. Write—if you have a technical problem involving fertilizer manufacture. Our Research may have the information you need.

Our manual, "Texaco Ammonia and Nitrogen Solutions For Farm and Industry," also contains much useful information for the fertilizer manufacturer. For your free copy, plus regular copies of "Tech-Tips" as they appear, write:

Texaco Inc., Petrochemical Sales Division, 135 East 42nd Street, New York 17, N. Y., or 332 South Michigan Avenue, Chicago 4, Ill., Dept. CF-3).

Tune In: Texaco Huntley-Brinkley Report, Mon. Through Fri.-NBC-TV



TEXACO
PETROCHEMICALS

AQUA AMMONIA, ANHYDROUS AMMONIA, NITROGEN SOLUTIONS, DIISOBUTYLENE, ODORLESS MINERAL SPIRITS, NAPHTHENIC ACID, PROPYLENE TETRAMER AND RUST INHIBITORS, CUMENE, BENZENE, TOLUENE

AMMONIUM NITRATE


C&I

new prilling process

C&I ammonium nitrate plants equipped with prill towers approximately $\frac{1}{3}$ the size of conventional towers produce a superior prilled ammonium nitrate fertilizer from an almost anhydrous melt. Because of its physical characteristics, this product can be stored and shipped in bulk. These plants can also be designed to produce any of the nitrogen solutions offered on the market today.

**THE CHEMICAL
AND
INDUSTRIAL CORP.**

CINCINNATI 26, OHIO



For more information on this proven
C&I process, write today for a new brochure which contains comprehensive data and flow sheets.

We're name dropping but...

Big Chief Kay-Two-Oh is only trying to impress you with the fact that all sizes of our 60% Muriate of Potash, by ANY name, are the best bet for your manufacturing operations.

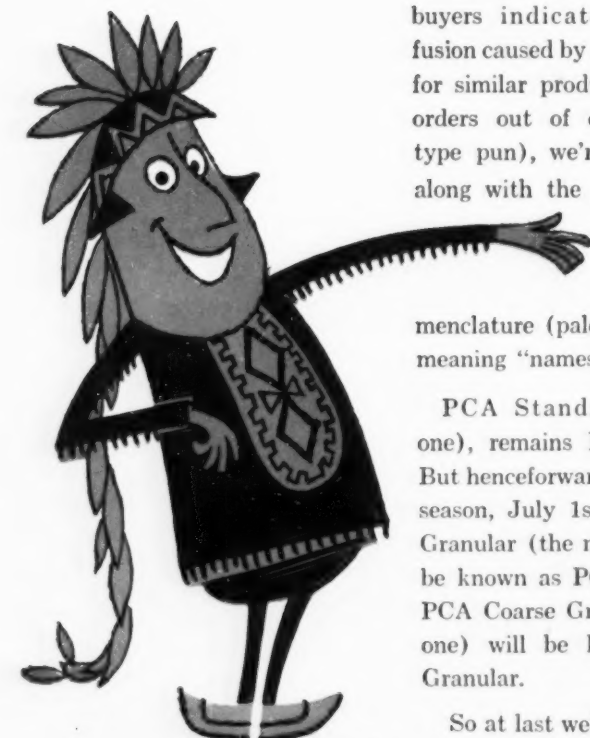
At a recent pow-wow, a special committee of the National Plant Food Institute suggested that distress smoke signals from buyers indicate (ugh!) confusion caused by different names for similar products. To bring orders out of chaos (Indian-type pun), we're happy to go along with the rest of the industry in standardizing our nomenclature (paleface-type word meaning "names").

PCA Standard (the little one), remains PCA Standard. But henceforward, as of the new season, July 1st, PCA Special Granular (the middle one) will be known as PCA Coarse, and PCA Coarse Granular (the big one) will be known as PCA Granular.

So at last we've answered the question: What's in a name? Convenience for you in ordering from any source. But for top quality potash, and top service, be sure to order from PCA, top man on the totem pole.

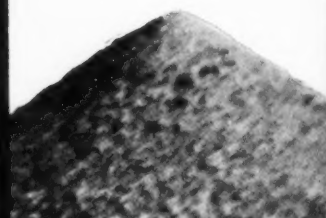
General Sales Office:
630 Fifth Avenue, New York 20
Midwestern Sales Office:
First National Bank Building, Peoria, Ill.
Southern Sales Office:
1776 Peachtree Building, N.E., Atlanta, Ga.
Canadian Sales Office:
2 Carlton Street, Toronto 2, Ontario

Phone, Write, Telex
or Wire Our General Offices
in New York:
Phone LT 1-1240, New York
TWX NY 1-5386



**POTASH
COMPANY
OF
AMERICA**
CARLSBAD, NEW MEXICO
"America's CHIEF Supplier of Potash"

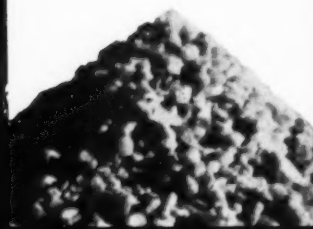
PCA STANDARD
(formerly Standard)



PCA COARSE
(formerly Special Granular)



PCA GRANULAR
(formerly Coarse Granular)



Arcadian® News

Volume 6

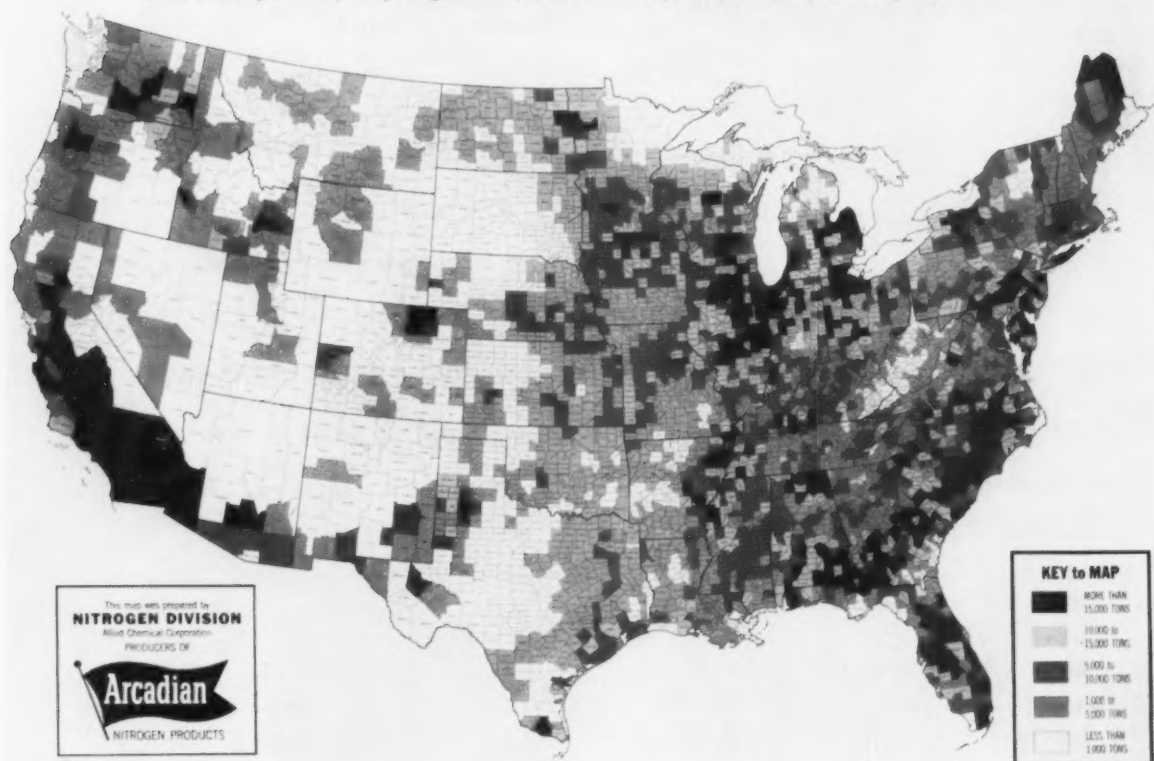
Nitrogen Division, Allied Chemical Corporation

Number 6

Get This Map FREE!

USE OF COMMERCIAL FERTILIZERS BY FARMERS

Based on county data compiled by Nitrogen Division, Allied Chemical Corporation, from U. S. Census of Agriculture, 1959.



This is a miniature reproduction of a big map, 28 inches long and 21 inches deep, lithographed in five colors, which you can obtain without charge from the ARCADIAN News. Just use the coupon on the next page. Based on 1959 U. S. Census of Agriculture figures, this

map shows the relative importance of each county in 48 states as a market for commercial fertilizers. On the map, counties that use more than 15,000 tons of commercial fertilizers are shown in red; 10,000 to 15,000 tons, in

(continued on next page)

ARCADIAN News for Fertilizer Manufacturers from Nitrogen Division, Allied Chemical

(continued from preceding page)

yellow; 5,000 to 10,000 tons, in green; 1,000 to 5,000 tons, in blue; less than 1,000 tons, in white. This map is ideal for quick reference. It shows you, at a glance, the exact location of the best fertilizer markets. You will use it many times in many ways. Only a limited number of these maps are available. To obtain your free copy, we suggest that you fill out and mail the coupon below today!

State Tables Also Available

In addition to the map, ARCADIAN News has also prepared an individual state table for each of 48 states, similar to those shown at right for Illinois and Indiana. Based on census figures, these tables give the following data for each state:

- Total farms in state.
- Farms using fertilizer.
- Total tons of fertilizer.

Each table also gives the following data for each major crop grown in the particular state:

- Acres fertilized.
- Tons dry material used.
- Tons liquid material used.

You can obtain individual state tables containing all of this information for the states in which you are interested, simply by mailing the coupon below. There will be a big demand for these tables and supplies are limited. We therefore suggest that you mail your coupon today. ARCADIAN News has compiled and reproduced this information as a service to the fertilizer industry and there is no charge for this service.

ILLINOIS

TOTAL FARMS IN STATE 154,640
FARMS USING FERTILIZER 107,632
TOTAL TONS OF FERTILIZER . . . 1,219,329

CROP	Acres Fertilized	Tons Dry Material	Tons Liquid Material
CORN	6,483,003	677,542	143,481
WHEAT	1,255,233	147,045	15,171
SOYBEANS	489,998	55,984	1,754
HAY & CROPLAND PASTURE	318,789	76,013	2,156
All Other Crops <small>Including Non-Cropland Pasture</small>	532,075	97,262	2,921
TOTAL ALL CROPS	9,079,098	1,053,846	165,483

INDIANA

TOTAL FARMS IN STATE 128,160
FARMS USING FERTILIZER 102,416
TOTAL TONS OF FERTILIZER . . . 1,005,600

CROP	Acres Fertilized	Tons Dry Material	Tons Liquid Material
CORN	4,839,631	581,559	58,415
WHEAT	1,163,838	140,987	6,182
SOYBEANS	823,685	63,284	1,437
HAY & CROPLAND PASTURE	302,942	40,451	1,284
All Other Crops <small>Including Non-Cropland Pasture</small>	890,769	108,103	3,898
TOTAL ALL CROPS	8,020,865	934,384	71,216

CLIP and MAIL this COUPON to get your map and tables promptly!

ARCADIAN News, Nitrogen Division, Allied Chemical Corporation, 40 Rector St., New York 6, N. Y.

Without charge, send me the big 5-color map showing use of fertilizers in every county of 48 states. Also send me fertilizer data tables for the states I have checked below.

- | | | | | | |
|--------------------------------------|------------------------------------|--|---|---|--|
| <input type="checkbox"/> Alabama | <input type="checkbox"/> Georgia | <input type="checkbox"/> Maine | <input type="checkbox"/> Nebraska | <input type="checkbox"/> Ohio | <input type="checkbox"/> Texas |
| <input type="checkbox"/> Arizona | <input type="checkbox"/> Idaho | <input type="checkbox"/> Maryland | <input type="checkbox"/> Nevada | <input type="checkbox"/> Oklahoma | <input type="checkbox"/> Utah |
| <input type="checkbox"/> Arkansas | <input type="checkbox"/> Illinois | <input type="checkbox"/> Massachusetts | <input type="checkbox"/> New Hampshire | <input type="checkbox"/> Oregon | <input type="checkbox"/> Vermont |
| <input type="checkbox"/> California | <input type="checkbox"/> Indiana | <input type="checkbox"/> Michigan | <input type="checkbox"/> New Jersey | <input type="checkbox"/> Pennsylvania | <input type="checkbox"/> Virginia |
| <input type="checkbox"/> Colorado | <input type="checkbox"/> Iowa | <input type="checkbox"/> Minnesota | <input type="checkbox"/> New Mexico | <input type="checkbox"/> Rhode Island | <input type="checkbox"/> Washington |
| <input type="checkbox"/> Connecticut | <input type="checkbox"/> Kansas | <input type="checkbox"/> Mississippi | <input type="checkbox"/> New York | <input type="checkbox"/> South Carolina | <input type="checkbox"/> Wisconsin |
| <input type="checkbox"/> Delaware | <input type="checkbox"/> Kentucky | <input type="checkbox"/> Missouri | <input type="checkbox"/> North Carolina | <input type="checkbox"/> South Dakota | <input type="checkbox"/> Wyoming |
| <input type="checkbox"/> Florida | <input type="checkbox"/> Louisiana | <input type="checkbox"/> Montana | <input type="checkbox"/> North Dakota | <input type="checkbox"/> Tennessee | <input type="checkbox"/> West Virginia |

Your Name: _____ Name of Firm: _____

Address: _____

Precautions for Handling Solutions in Hot Weather

Fertilizer plant operators who ignore the effect of heat on the physical properties of ammoniating solutions are liable to be in "hot water" in hot weather. The most efficient operators keep one eye on vapor pressure curves and the other eye on the thermometer, so they can handle nitrogen solutions properly when the temperature goes up.

In the summer, the vapor pressure of solutions is a matter of serious concern from the moment of arrival of the tank car at the plant until the ammonia in the solutions has been neutralized by superphosphate or acid in the mixer.

Two Pressures

Two pressures are involved in hot weather handling—the vapor pressure of the solution and the air pressure that is required to move the solution through the equipment. Both of these pressures tend to increase in warm weather, and all equipment must be able to withstand the extra pressure. Gauges and safety devices must be in good working condition. The hose from the tank car should be securely connected to ample fittings with heavy metal clamps having four large bolts each. *(Make certain that all pressure is released before disconnecting hose. This is particularly important when quick-acting couplings are used.)*

Importance of Air Pressure

Most vapor-pressure, warm-weather problems can be overcome by maintaining enough *air pressure* to keep the ammonia in solution at all points in the system where gas formation can cause

trouble. Always keep the air pressure higher than the vapor pressure.

In the Tank Car

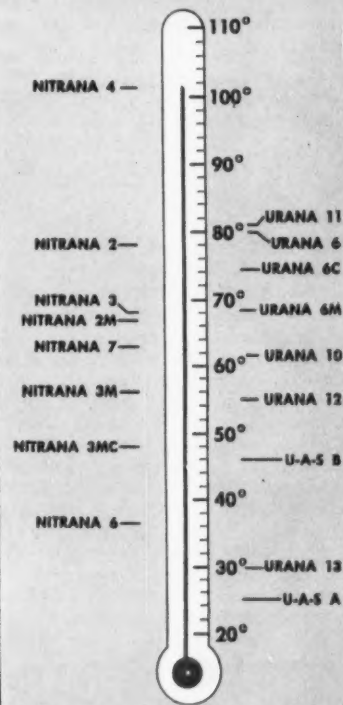
Insufficient air pressure in the tank car can permit the rush of enough ammonia gas through the hose to make the operator believe that the car is empty. If there is much back-pressure from hot storage tanks, measuring tanks or pipelines, it may be impossible to move any nitrogen solution from the car until the back-pressure is relieved or the pressure in the car is built up with air. Incidentally, pressure cannot be gauged accurately at any point while a fluid is moving rapidly past that point in the system.

At the Pump

At the suction side of the pump, where the relative vacuum has the same power as increased temperature to release ammonia gas, even a small amount of gas will vapor-lock almost any pump. Leakage of air into the suction line will also vapor-lock pumps. Centrifugal pumps can often be made to function by throttling down the discharge volume from the pump enough to reduce the pull on the suction side. But this procedure is of little help in positive-displacement pumps, such as gear and piston pumps, since they deliver about equal volumes of liquid at all discharge pressures. Furthermore, these pumps may be damaged by excessive pressures.

Trouble at the pump is sometimes caused by hot suction lines. These lines may be cooled with water, or cooled by allowing some ammonia to vaporize

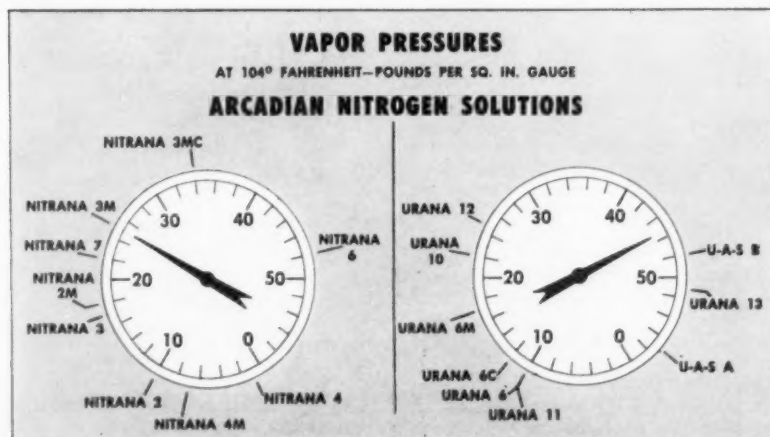
APPROXIMATE BOILING POINTS DEGREE FAHRENHEIT ARCADIAN AMMONIATING SOLUTIONS AT 0 LBS. GAUGE PRESSURE (ATMOSPHERE PRESSURE)



through the stopped or slowly turning pump so as to refrigerate the metal. White or aluminum paint on piping and tanks reflects the sun's rays to reduce heating.

At the Volume Meter

In volumetric meters and measuring tanks, the solution will weigh less per gallon if it develops many bubbles due to low pressure. The bubbles can be so microscopic that they escape attention. Sometimes the bubbles are moving actively enough to make it impossible to read the level of the solution in gauge glasses or glass rotameter tubes. Adequate air pressure will correct this condition. Even when ammoniating solutions are in 100 per cent liquid state while being measured volumetrically, they average one per cent lighter weight per gallon for each 25 degrees F. increase above the standard measuring temperature of 60 degrees F. The exact data on temperature-weight relationships for all ARCADIAN Nitrogen Solutions are available on request from Nitrogen Division, Allied Chemical Cor-



"ARCADIAN", "NITRANA", "URANA" and "U-A-S" are trade-marks of Allied Chemical Corporation.

(continued on following page)

(continued from preceding page)

poration. The specific gravity or weight of anhydrous ammonia decreases still faster with an increase in temperature—about one per cent for each six degrees F. increase in temperature.

In Tanks and Pipes

All these liquids generate high pressures when they are trapped within tanks 100 per cent full of liquid, or in pipe lines between two closed valves. Ample vapor space must be allowed in all tanks. This takes a considerable amount of head space for anhydrous ammonia.

In the Mixer

In the distributor pipe inside the fertilizer mixer, the heat may be so great that special techniques must be invoked for coping with large amounts of ammonia gas. For specific help on this problem, see your Nitrogen Division, Allied Chemical, technical service representative.

Hot weather troubles with any ammoniating solution may start when the temperature of the solution reaches the boiling point at atmospheric pressure. This is a lower temperature than you would normally expect trouble, but it usually develops when you are using a pump located beneath the supply tank. If enough air pressure is added, it will prevent volatilization of ammonia gas at the critical points. As shown in the table, the boiling points of some ARCADIAN Nitrogen Solutions at atmospheric pressure, and their vapor pressures at 90 degrees F. and at 104 degrees F., show a need for alertness in handling.

Vapor Pressure Changes

At increased temperature, an ammoniating solution takes on the vapor pressure properties of a more volatile solution. For instance, at 90 degrees F., NITRANA 2 develops a vapor pressure of only 4 pounds, so that handling is easy. But at 104 degrees F., its vapor pressure of 10 pounds is about the same as that for NITRANA 2M, NITRANA 3 and URANA 6M at 90 degrees F. Warm weather always requires extra attention in moving solutions.

For example, at 100 degrees F. atmospheric temperature, the contents of an 8,000-gallon uninsulated tank car loaded with NITRANA 2 develops the following temperature and pressure:

Maximum daily high pressure: 29.3 pounds at gauge

Average daily high pressure: 13 pounds
Liquid temperature at the top level in the tank car: 108 degrees F.

Liquid temperature in the middle of the tank car: 86 degrees F.

Liquid temperature at the bottom of the tank car: 81 degrees F.

Vapor temperature at the top of the solution: 131 degrees F.

Judging from the published pressure-temperature relationship, you might expect that 100 degrees F. temperature would build up only 8 pounds of pressure. The additional 5 pounds at average high pressure, and 21 pounds at maximum pressure, could cause trouble for an unwary operator.

Other spots where it may be hotter than you expect are in pipelines exposed to the sun, near metal siding in the sun, near dryers, in or near the hot mixer, or almost anywhere in a warm building.

Changing Solutions

In summer, many fertilizer producers change to a nitrogen solution which has a lower vapor pressure to avoid problems. You have a wide choice in the big line of ARCADIAN Nitrogen Solutions to meet the most exacting requirements. However, if you choose to use your winter solution, you may continue using it by making a few simple changes in equipment and operation. For instance, you can insulate your pipelines and improve the ease of operation both in hot weather and in cold weather.

You can get help in choosing the right ARCADIAN Nitrogen Solution by asking your Nitrogen Division technical service representative. Summer or winter, you can realize maximum benefits in fertilizer manufacture by picking the right solution for every situation. For technical advice and assistance, contact Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.

GREEN FIELDS CAN BE SALES MAKERS

Green fields speak as loud as big yields to many farmers. When the corn leaves lap in the row, the oats are shoulder-high, and the pasture is knee-high to cows, any farmer loves to show off his crops. That's a good time to go and see him, if he uses your fertilizer. It's also a good time to show his crops to other farmers.

One farmer applied a double dose of fertilizer to his corn by mistake. He made a big profit on the extra tonnage of silage produced by the extra fertilizer. But he didn't tell his neighbors about yields and profits. He told them how tall and green his corn grew during a dry season. He knew he made money from fertilizer. This was dramatized to him by the lush, green crop right before his eyes all summer.

It will pay you to take advantage of a farmer's pride in a good crop grown with your fertilizer. He can be an excellent salesman and demonstrator for you. Farm calls, when crops are green and growing, can produce plenty of success stories. The best way to tell these success stories is to take other farmers to see them. This enthusiasm sells fertilizer.

BEST N FOR YOUR N-P-K



NITROGEN

There are many reasons why it pays you to use ARCADIAN® Nitrogen Products in the manufacture of your mixed fertilizers. Here are only a few:

You are served by the leading producer of the most complete line of nitrogen products on the market. You have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You get formulation assistance and manufacturing advice from the best-qualified technical service staff in the industry. You benefit from millions of tons of nitrogen experience and the enterprising research that originated nitrogen solutions. You get many important bonus values when you make ARCADIAN Nitrogen the N in your N-P-K.

ARCADIAN Nitrogen Products

NITRANA® Nitrogen Solutions
URANA® Nitrogen Solutions
DURANA® Nitrogen Solutions
U-A-S® Nitrogen Solutions
N-dure® Solution
A-N-L® Nitrogen Fertilizer
Ammonium Nitrate
UREA 45 Nitrogen Fertilizer
Sulphate of Ammonia
American Nitrate of Soda



NITROGEN DIVISION

MAIN OFFICE: 40 Rector St., New York 6, N. Y.

Research Briefs...

Rhodesia and Nyasaland Tobacco Research Board has proved with 18 fertilizer trials, from 1952 to 1958 at the Experiment Station and on farms the importance of adequate dressing with phosphate and potash. It appeared that the phosphate treatment effect—which was evident in yield and grade index—was much greater when in addition adequate quantities of potash were applied.

A Sulfolipid has been isolated by workers at Penn State. This sulfolipid occurs in all photo-synthetic plants and bacterial tissue, and has been identified as 6-sulfo-6-deoxy-a-D-glucopyranosyl-di-glyceride. The point from a fertilizer standpoint is that phosphorus-deficient plants do not form sulfolipid.

50 pounds of phosphate are needed to maintain the fertility of soil that has grown 4 tons of alfalfa per acre. Vice-versa, four tons per acre

can be achieved with proper use of phosphate, according to Colorado State research.

Liquid phosphoric acid will be tested at a number of points this year to compare time of application, amounts and corn response. University of Illinois is doing this research.

More sugar per acre was the result of early beet planting, and early use of fertilizer. Despite lower sugar content of early-planted beets, the overall result was 560 more pounds of sugar per acre, according to Colorado State researchers.

Protein in fertilized pasture grasses is considerably higher than in non-fertilized. Furthermore, non-fertilized grasses are less digestible when they mature. University of Florida comes up with this information, of special import to fertilizer makers who sell dairy farms.

Land Prices to Hold Level

For the next five years we may expect little or no rise in farm land prices, if an Auburn economist is correct. Fox Helms of the University said recently that only a "jolt" could set off a series of farm land prices any time soon.

W. R. Grace Unveils New Smog Control

Speaking at the annual meeting of stockholders, Mr. J. Peter Grace, president of W. R. Grace & Co., told about the development of a new catalyst to control smog from automobile exhausts, which greatly reduces the percentage of smog-causing hydrocarbons as well as carbon monoxide when substituted for the standard muffler in the exhaust system. It is the culmination of more than two years of research.

Mr. Grace exhibited a prototype of the reactor muffler system of the future, which had been operating on an automobile in actual road tests for more than 25,000 miles. The muffler was built by Norris-Thermador Corp. of Los Angeles.



**Fertilizers and
Fertilizer Raw Materials**

**INTERNATIONAL ORE
& FERTILIZER CORPORATION**

OFFICES OR AFFILIATES IN

Melbourne, Australia
Vienna, Austria
Rio de Janeiro, Brazil
Calgary, Canada
London, England
Paris, France
Dusseldorf, Germany
Bombay, India
Calcutta, India
New Delhi, India
Secunderabad, India
Teheran, Iran
Florence, Italy
Tokyo, Japan
Seoul, Korea
Luxembourg, Luxembourg
Mexico City, Mexico
Manila, Philippines
Lisbon, Portugal
Durban, South Africa
Madrid, Spain
Lausanne, Switzerland
Tampa, Florida, U.S.A.

500 FIFTH AVENUE, NEW YORK 36, N. Y. • DIVISIONS: Phosphate Rock Export Corporation, Seed & Feed Corporation

National Plant Food Institute Meets June 11-14

Annual Convention at
White Sulphur Springs
features Agriculture Secretary,
other noted speakers

RINFRET



FREEMAN

FIFIELD



AHLGREN

STREETMAN



Secretary of Agriculture Orville L. Freeman will be among the outstanding group of speakers at the annual convention of the National Plant Food Institute, to be held at The Greenbrier, White Sulphur Springs, W. Va., June 11-14, Institute President Paul T. Truitt has announced.

Other prominent authorities in the field of agriculture and economics also are scheduled to be heard.

The Program for Monday, June 12 will include: Welcoming remarks by J. D. Stewart, Jr., Louisville, Ky., chairman of the Board of Directors of the Institute; Dr. Pierre Andre Rinfret, a distinguished economist, who is vice president and director of Economics Division, Lionel D. Edie & Company, Inc., New York City, on "Economics of Tomorrow"; followed by Secretary of Agriculture Freeman. Other features of the program Monday morning will be the presentation of Distinguished Service Citations to past presidents and past chairmen of the board of the Institute and the organization's annual business meeting.

The program on Tuesday, June 13 will feature addresses by W. M. Fifield, provost for Agriculture, University of Florida, Gainesville, who will speak on the subject of "Com-

ing Developments in Farming"; Henry L. Ahlgren, associate director, Extension Service, University of Wisconsin, at Madison, who will speak on the "Future Role of Agricultural Extension"; and J. E. Streetman, vice president and director of Marketing, Ralston Purina Company of St. Louis, Missouri. Scrolls will be presented to the winners in the "Soil Management Award for Editors" contest on Tuesday.

Mr. Truitt will preside at both program sessions.

A meeting of the Board of Directors will be held Sunday evening, June 11 and on Wednesday morning, June 14.

Committee chairmen for the 1961 convention are: Mrs. Gene Van Deren of Cynthiana, Ky., Bridge and Canasta Party Committee; Mrs. J. Fred Corkill of Los Angeles, Calif., Ladies' Golf and Putting Committee; W. R. Morgan of New York City, Men's Golf Committee; Tracy L. Adcock of Chicago, Horse-shoe Pitching Contest Committee; Mr. and Mrs. W. B. Copeland of Little Rock, Ark., Hospitality Committee; Mrs. John W. Hall of Denver, Colo., Ladies' Committee; L. Dudley George of Richmond, Va., Memorial Committee; and Dr. Richard B. Bahme of San Francisco, Tennis Committee.

Canadians to Hold 16th Annual Convention

The Manoir Richelieu, Murray Bay, Quebec, will be the traditional scene of the Canadian Fertilizer Association, holding its 16th annual convention August 16-20. While complete plans have not yet been announced, meetings are fabulous. An overnight boat trip is one of several ways to reach the hotel,—which is a magnificent, ivy-covered building with cottages, fishing camps, swimming pool, horseback trips, trips by steamer to the famed Saguenay Gorge—and many other delightful indoor and outdoor features.

Delbert Dupre is convention chairman. Accommodations chairman is Dr. R. P. Pennington, Suite 1112, 2 Carlton St., Toronto 2, Ontario.

N. Y. Fertility Association to Gather 125 or More

More than 125 persons are expected to attend the annual meeting of the Empire State Soil Fertility Association at Hamilton College, Clinton, N. Y., July 11-12.

Sponsored in cooperation with the New York State College of Agriculture at Cornell University, the two-day event will feature tours to central New York farms. A main purpose of the meeting will be to bring industry and farm agency representatives up to date on the latest developments in soil science.

Keynoting the event at a banquet Tuesday evening, July 11, will be Frank J. Welch, assistant secretary of agriculture. The Washington official will speak on "Water Research and Conservation Problems."

The group will tour Oneida County farms July 12. Heading the tour, to include dairy farms and a snap bean operation, will be Prof. L. C. Cunningham of Cornell. Emphasis will be placed on modern tillage, harvesting, and new equipment. The relationship between good soil fertility practices and sound farm management will be studied.

ACS Meeting September 3-8

While the hotel headquarters has not been announced, the American Chemical Society's Division of Fertilizer and Soil Chemistry tells us they will meet in Chicago, September 3-8. A feature of the program will be a symposium on Micronutrients, and there will be other valuable papers on Plant Nutrients, Processes and general subjects of interest to the fertilizer industry, according to D. R. Boylan, division secretary.

1961-62 to See Full Sulphur Program

Dr. Russell Coleman, president of the one-year-old Sulphur Institute has reported that the foundation is now fully laid for full operation during 1961-62 for its research program into new and expanded uses for sulphur in all its forms. Some research was begun during the current Institute year, and the new budget provides for a variety of projects to be conducted by both public and private research organizations in many parts of the world, especially in Europe and the U.S.

In the agricultural area, the studies will deal primarily with the use of sulphur as a plant nutrient. A number of projects are slated to assess the sulphur needs of soils in various areas of the world, including Europe, the United States, South America, Australia and India. Also to be studied is the role of sulphur in tropical oil crop production. Other investigations will have as their aim the development of suitable soil and tissue tests to help predict sulphur needs of crops.

Economic studies will be a part of the industrial and agricultural research programs. In addition, the 1961-62 budget will permit The Institute to continue its support of the program of the Food and Agriculture Organization of the United Nations to increase fertilizer consumption in underdeveloped areas of the world. This program is a part of FAO's Freedom From Hunger Campaign. Also slated are studies of the economics of fertilizer manufacturing processes and of probable trends during the next five years in the kinds and amounts of fertilizer to be used.

Northeast Bankers Booklet Issued

"Farm Profits Don't Just Happen" is the title of a booklet recently published and widely distributed by the State Bankers Associations and State Colleges of Agriculture of Maine, New Hampshire and Vermont, in cooperation with the National Plant Food Institute.

Merle Adams, NPFI Northeastern regional director, and staff members of the Washington office worked with the representative groups in these States in developing and publishing this 16 page booklet.

To date, 40,000 copies of the publication have been furnished to the various colleges and bankers associations in the three States for distribution to farmers.

Association Activities...



A soil moisture gauge and a special plaque were presented to Harold Stark, "Colorado Sugar Beet King," by the National Plant Food Institute at the recent Colorado Production Achievement Awards Program in Denver. Mr. Stark, Ft. Morgan, is the first two-time winner in the "10,000 Pound Beet Sugar Club" in Colorado. Pictured with Mr. Stark (seated right) are, standing left to right, Ed McMillan, Spencer Chemical Company and president, Rocky Mountain Plant Food Association; and John Hall, president, Potash Company of America and vice-chairman, N.P.F.I. board of directors; and seated left, Frank A. Kemp, president, Great Western Sugar Company, featured speaker at the program.

'Role of Fertilizer' Short Course Topic

"The Role of Fertilizer in Our World Economy" will be the title of one of the headline reports at a Fertilizer Short Course sponsored by the Soil Science Society of America at Purdue University, Feb. 12-13, 1962, according to Dr. Malcolm MacVickar, Ortho Division, California Chemical Co., chairman of the committee arranging for the course.

In addition to economic aspects, speakers will present the most recently available information on fertilizer manufacturing, technology, resources and use in the United States, it was announced by Dr. Werner L. Nelson, American Potash Institute, president of the Soil Science Society of America.

On the agenda for Feb. 12 will be reports on "Economic Principles in Fertilizer Use;" "Advances in Nitrogen Manufacturing;" "Advances in Nitrogen Fertilization;" "Advances in Phosphate Manufacturing;" "Advances in Phosphate Fertilization;" "Advances in Processing and Manufacturing Potassium Fertilizers;" and "Agronomic Considerations in Potassium Fertilization."

The program Feb. 13 will include discussions on "Advances in Manufacturing of Secondary and Trace Elements;" "Advances in Secondary and Trace Element Fertilization;"

Association Activities

"Advances in Manufacture of Mixed Fertilizer;" and "Advances in Foliar Feeding of Plant Nutrients."

Dr. MacVickar said the names of the speakers will be announced at a later date.

College scientists, industry men and others interested in fertilizer technology and use are invited to attend the two-day sessions.

The Feb. 13 program will be adjourned in mid-afternoon to enable those present to travel to Chicago for the annual joint meeting of Midwestern Agronomists and Fertilizer Industry Representatives at the Edgewater Beach Hotel, Feb. 15-16. This session is sponsored by the Midwest division of the National Plant Food Institute.

Members of the committee developing plans for the Short Course include: Dr. R. D. Munson, American Potash Institute; Dr. L. B. Nelson, Tennessee Valley Authority; R. W. Starostka, Davison Chemical Division, W. R. Grace & Co.; and H. H. Tucker, Sohio Chemical Co.

Turfgrass Council Formed in Ohio

Formation of the Ohio Turfgrass Council was completed at an organizational meeting recently at Columbus.

The new organization's membership comprises representatives of various groups interested in the turfgrass industry. The Council mapped a program for turfgrass research and education.

(concluded on page 71)



Key Personnel Sponsoring Conference in Pacific Northwest

Back Row—Dr. T. L. Jackson, Oregon State University, Program Committee; Dr. H. B. Cheney, Oregon State University, Chairman Program Committee; Royal Tarter, Member of Committee on Arrangements.
Front Row—Harold Rud, President Pacific Northwest Plant Food Association, Inc.; Dale Massie, Chairman Committee on Arrangements.

Program Set for June 27-29 Conference of Pacific Northwest Industry Group

12TH ANNUAL PACIFIC NORTHWEST REGIONAL FERTILIZER CONFERENCE

June 27, 28, 29, 1961—Marion Motor Hotel, Salem, Ore.
Tuesday, June 27, 1961—A. M.

- 9:20- 9:50—Soils, Fertilizers and Crop Quality: W. H. Allaway, Plant, Soil and Nutrition Laboratory, ARS, Ithaca, New York
- 9:50-10:20—"Quality Forage—Not Just Roughage," R. E. Wagner, American Potash Institute, Washington, D. C.
- 10:35-11:50—"Forage Quality, From the Animal, Crops and Soils Viewpoint," A Panel Discussion. Moderator, Norman Goetze, OSU, Corvallis; K. J. Morrison, WSU, Pullman; J. E. Oldfield and T. L. Jackson, OSU, Corvallis.
- 12:00 Noon—Buses depart for field trip: T. L. Jackson in charge. Lunch will be served on bus.

P. M.

- 1:00- 2:15—Tour of North Willamette Branch Experiment Station, Wilsonville
- 2:15- 2:45—Enroute
- 3:00- 4:30—Tour of Red Soils Branch Experiment Station, Oregon City
- 4:30- 5:30—Enroute to Marion Hotel

Wednesday, June 28, 1961—A.M.

- 8:45- 9:15—The Effect of Fertilizer on Yield and Quality of Freezing Peas in the Blue Mountain Area: H. Marr Waddoups, Lamb-Weston, Inc., Weston, and Barrie Gassett, Pendleton Grain Growers, Pendleton
- 9:15- 9:45—Effects of Nitrogen, Phosphorus and Potassium on Yield and Quality of Potatoes in the Columbia Basin: Robert Kunkel, WSU, Pullman and I. A. Dow, WSU, Prosser
- 9:45-10:15—Influence of Nitrogen Fertilizer on Canning Quality of Elberta Peaches: E. L. Proebsting, Jr., G. H. Carter, D. W. Ingalsbe and A. M. Neubert, WSU, Prosser

10:15-10:35—Recess

10:35-11:50—Panel Discussion on Forage Quality, Norman Goetze, Moderator, OSU, Corvallis; K. J. Morrison, WSU, Pullman; J. E. Oldfield and T. L. Jackson, OSU, Corvallis

P. M.

12:00- 1:30—Luncheon—M.C.: Harold Rud, President of Pacific Northwest Plant Food Association
1:45—Buses depart for tour of agriculture in Willamette Valley Royal Tarter, Meeker Fertilizer Company, Salem; Dale Massie, Cominco, Salem; and Ben A. Newell, Marion County Extension Agent, Salem, in charge. Buses to arrive at Meeker Ranch at 5:30 P.M.

4:40—Extra bus departs Marion Hotel for Meeker Ranch

5:30- 6:30—Allied Trades Cocktail Hour at Meeker Ranch—Trevor Steele in charge

6:30—Barbecue at Meeker Ranch

Thursday, June 29, 1961

Moderator, H. B. Cheney, OSU, Corvallis

A. M.

9:00- 9:30—Result of Plant Analysis Research with Lima Beans: Albert Ulrich, University of California, Berkeley

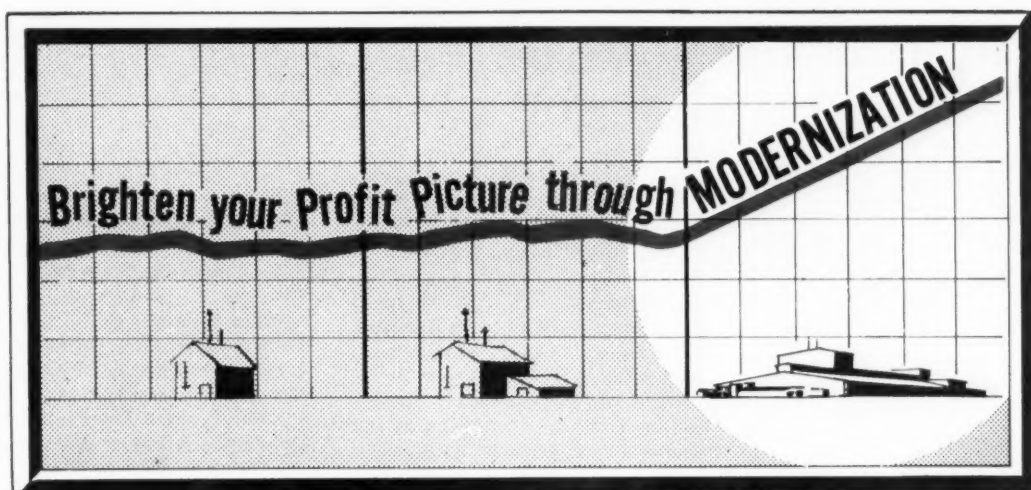
9:30-10:00—Brining Quality of Royal Anne Cherries as Affected by Fertilizers: O. C. Compton, OSU, Corvallis

10:00-10:20—Recess

10:20-11:50—Report and Discussion on Plant Analysis and How it is Used in the Pacific Northwest Washington, W. P. Mortsen—Idaho, G. O. Baker

Utah, J. L. Haddock—Oregon, S. B. Apple and D. P. Moore

12:00 Noon—Adjourn



TO ECONOMIZE...MODERNIZE

If your operating costs are playing havoc with your profits, then you owe it to yourself to investigate an invaluable service being offered by the Sackett Organization to improve your competitive situation through a modernization of your existing facilities.

We are thoroughly qualified to execute programs of this kind with a minimum of interference with production operations and with maximum re-use of serviceable existing equipment.

Numerous programs of this kind have been successfully accomplished by us during recent years at a substantially lower capital expenditure than would have been required in the construction of new facilities.

Get our up-to-the-minute counsel
on your modernization program.
It is available without cost.



1727 S. Highland Ave.
Baltimore 24, Maryland

**America's Foremost Creative Designers and Builders Modern
Plants and Equipment for the Fertilizer Industry.**

- Granular N-P-K TVA type Process Plants
- Granular N-P-K Slurry Process Plants
- Diammonium Phosphate Plants
- Normal, Enriched and TSP Plants
- Semi-Granular and Powered Fertilizer Plants
- Bulk Blending Plants

Armour breaks ground for Alabama nitrogen plant

Armour Agricultural Chemical Company broke ground for its new \$30,000,000 nitrogen plant at Cherokee, Alabama (near Sheffield-Florence-Tusculum in the northwestern part of the state) April 25.

Top state and local officials were on hand, along with the top brass from Armour and M. W. Kellogg Co., prime contractor on the project.

Principal speakers included: Alabama Governor John Patterson; Cherokee Mayor Raymond E. Pate; William Wood Prince, board chairman and chief executive officer of Armour and Company; Armour President E. W. Wilson; Kellogg President Warren Smith; and Champ Carry, president of Pullman, Inc., Kellogg's parent company.

W. E. Shelburne, of Atlanta, president of Armour Agricultural Chemical and vice president of Armour and Company, was master of ceremonies.

Invited guests attending the ground-breaking included civic and business leaders, members of the press and broadcast media, representatives of the contracting firms taking part in the construction of the facility, and others.

The huge new nitrogen fertilizer manufacturing complex is part of a \$60,000,000 expansion program currently being undertaken by Armour. In addition to the new facility at

Cherokee, the program will include construction of a phosphate plant near Fort Meade in Polk County, Florida.

Construction of the Armour nitrogen plant at Cherokee is being financed by the town of Cherokee under terms of a \$25,000,000 bond issue said to be the largest of its kind in the nation. When completed, the plant will be leased to and operated by Armour Agricultural Chemical Company. It will be the largest facility of its kind in the country.

This complex will consist of six different manufacturing plants on the one 1,200-acre site, using common sources of power, water and natural gas. Tons-a-day capacities of the six plants will be ammonia, 360; urea, 50; nitrogen solutions, 250; nitric acid, 300; ammonium nitrate, 250, and ammonium phosphate, 500.

Appreciable quantities of ammonium phosphate base high analysis mixed fertilizers will be produced by the plant system.

The feedstocks for these plants will consist of air, natural gas, sulphuric acid, phosphoric acid, and potash. The phosphoric acid will be supplied from the new Armour plant in Florida.

The project is scheduled for completion during the first quarter of

1962, and the completed facility will employ some 250 persons.

On the site the plant complex will have two miles of new roadway and three miles of railroad trackage. The Southern Railway will build a four-mile spur from Cherokee to the site. Altogether, the plant group will occupy a fenced area of approximately 100 acres.

M. W. Kellogg Co., coordinator for the entire project, will engineer, procure materials for, and construct the ammonia and urea plants. It will also be responsible for the construction of all off-site facilities.

J. A. Loep, Kellogg construction executive, is the resident manager for the project.

The Chemical & Industrial Corporation, of Cincinnati, has the contract for engineering-procurement-construction of the nitric acid, nitrogen solutions and ammonium nitrate plants, while Chemical Construction Corporation, New York, is handling the work for the ammonium phosphate plant.

In addition, a new electric power substation will be built on the grounds by the Tennessee Valley Authority.

Armour officials said that besides the new projects in Alabama and Florida, and other expansions, the company will also continue an extensive modernization program for existing fertilizer mixing plants. There are 34 of these plants located in the United States, and one in Puerto Rico.

General offices of the company, which is one of the six divisions of the Armour Chemical Industries, are located in Atlanta.



Left: Taking part in the ground-breaking ceremony at the new Cherokee, Ala., nitrogen plant of Armour Agricultural Chemical Company were, left to right: E. W. Wilson, of Chicago, president of Armour and Company; Governor John Patterson of Alabama, and William Wood Prince, of Chicago, chairman of the board and chief executive officer of Armour and Company. The new plant, said to be the largest of its kind in the country, is scheduled for completion in the first quarter of 1962.

Below: Shown in an architect's sketch is the multi-million dollar nitrogen plant complex; the facility will consist of six different manufacturing plants on one site, using common sources of power, water and natural gas. The complex will produce ammonia, urea, nitrogen solutions, nitric acid, ammonium nitrate and ammonium phosphate.



CALIFORNIA

United States Borax & Chemical Corporation began construction last month to increase further capacity at its Boron installation, it was announced May 9 by Hugo Riemer, president.

"The current projects will raise production of both primary and specialized borax products; however, the principal immediate benefit will be an increase in the supply of anhydrous products upon completion of additional fusing facilities," the president declared. "The expansion is part of a continuing program designed to insure adequate supplies of various forms of borax as demand rises."

Mr. Riemer pointed out that increased production capacity, beyond that for which the plants were originally designed, has been made possible to a large extent through technological progress without proportionate capital outlays for additional facilities.

The Company has negotiated a long-term lease agreement with the Carter Company providing for the construction of a new U. S. Borax headquarters building in Los Angeles.

The 275,000-square-foot office and parking structure, will be ready for occupancy early in 1963. U.S. Borax will lease the nine-story building for an initial term of 30 years with options to extend the lease for two additional 10-year periods.

Actimin Inc. has been incorporated at Monterey to conduct mineral processing for fertilizer, by Leslie E. Cixon, Robert H. Morton, E. O. Hickman and Leona A. Spadero.

Fleurin, Inc., has incorporated for \$25,000 at Redlands to manufacture chemical garden fertilizer, by Mrs. Ann A. Habecker, John C. Habecker and Allan S. Barr.

State Chemical Corp., Los Angeles, has been incorporated to manufacture fertilizers and chemicals, by Frank DeMarco, Jr., Freda Francisco and Jacqueline Ainsworth.

IDAHO

Simplot Soilbuilders in Idaho Falls, Idaho, has announced expansion program to cost some \$125,000, according to the joint announcement May 7 by W. Grant Kilbourne, general manager, Minerals and Chemical division, J. R. Simplot Co., Pocatello, and J. L. Wursten, man-



ager, Simplot Soilbuilders, Idaho Falls.

The fertilizer bulk handling and mixing facilities from the Anaconda (Mont.) Co. fertilizer plant will be moved to Idaho Falls this month.

Mr. Kilbourne noted that this will coincide with the dismantling and movement of the large ammonium phosphate plant from Anaconda to the J. R. Simplot chemical fertilizer plant location in Pocatello. Construction of these facilities is scheduled in September.

A new fertilizer warehouse will also be built at Idaho Falls, adjacent to the existing plant.

Further development of Simplot's liquid fertilizer facilities and services in the Idaho Falls, Aberdeen, Blackfoot and St. Anthony areas was also disclosed by Wursten.

Increased storage facilities plus the addition of two spray trucks and other delivery and application equipment will greatly accelerate the fast growing liquid fertilizer program for Simplot dealers and customers in Eastern Idaho.

Latah County Grain Growers, Moscow, have put their \$60,000 liquid fertilizer storage plant in operation. It has a 67,000 gallon capacity.

IOWA

Monsanto Chemical has taken an option on 500 acres of industrial land in the Muscatine community, according to word from the Muscatine Development Corporation. This expires August 1. The tract is on the Mississippi River, and is considered as a site for a 15,000 ton anhydrous ammonia terminal—being also convenient to rail facilities.

MINNESOTA

Northwest Cooperative Mills, Inc., of St. Paul, will build a \$4,000,000 fertilizer plant near Pine Bend to produce 100,000 tons annually of water soluble ammonium phosphate. The facility will utilize techniques and equipment new to the fertilizer industry, they state, and will be the

most modern of its kind in the nation.

The contract for engineering and construction was awarded to the Process Division of the Austin Company (see item on page 48).

Ground will be broken June 15, and total construction time is estimated at 12 to 14 months.

Northwest Cooperative Mills—which operates superphosphate and conventional mixed fertilizer granulating plants at Winona, Minn. and Green Bay Wis.—is owned jointly by four other cooperatives: Farmers Union Central Exchange of South St. Paul, Midland Cooperatives of Minneapolis, Central Cooperatives, Superior, Wis., and Farmers Union Grain Terminal Assn. of St. Paul. Central Farmers Fertilizer Co., a regional cooperative headquartered at Chicago, will also assume a share of ownership in the near future.

Output of the new ammonium phosphate facility will be marketed entirely through the Northwest Mills member cooperatives. This will give the plant a distribution area embracing Minnesota, the Dakotas, Iowa, Wisconsin and upper Michigan.

About eight different formulas of ammonium phosphate fertilizers will be produced, according to William E. Jones, general manager of Northwest, and the new plant will employ about 45 permanent and 100 seasonal workers.

Pine Bend was selected as the plant site due to the proximity of raw material sources. Ammonia will come from the 80,000 annual tons capacity of St. Paul Ammonia Products Co.—a cooperative-sponsored plant erected in recent years—while sulfuric acid and steam will be provided by North Star Chemical Company. Both of these plants are situated in the Pine Bend industrial development. Phosphate rock will be shipped in from the South through Central Farmers Fertilizer Co.

—Around the Map...

MISSISSIPPI

Dixie Fertilizer. Meridian, has completed the second phase of its plant construction program, and has begun distribution of Velva-Gro plant food, using specially designed, fully automatic packaging equipment. The company has already introduced its Hill-Actinite, with good distribution in the South already established. J. A. Hill, Jr., is president.

* * *

Southeastern Liquid Plant Food Company, with plants in Arkansas, Louisiana and three other points in Mississippi, has revealed plans for a \$500,000 liquid fertilizer plant at Verona. The plant will cover most of a 15 acre site.

C. DeWitt Walcott is president of the liquid fertilizer manufacturing firm—which headquarters at Greenville, Miss. as Delta Liquid Plant Food Co.—which has also announced two new liquid fertilizer manufacturing plants for Alabama, one to be located in the Mobile area.

* * *

Riverside Industries, with home plant at Marks, and plants at Pontotoc, Tupelo and Starkville, has opened a warehouse at Kosciusko, with Allen Simmons in charge.

NEW MEXICO

Potash Company of America expects to complete by the middle of next year the \$3,500,000 modernization of its Carlsbad facilities. (See CF April) The project includes doubling the granular flotation unit and installation of a new flotation system for the balance of the ore process.

Following flotation, new and modern equipment will handle the potash and waste materials, and provide improved sizing control. The existing circuit for recovering potash not picked up in flotation will be revised.

As we have previously reported, the new equipment will permit processing of ores now by-passed because of magnesium content, and should extend to at least 16 years the reserves formerly calculated at 10 years.

OHIO

Central Chemical's plant at Andover—acquired by the Hagerstown, Md. firm in 1959 from Lee J. Pelen, who established the plant as Green-Leaf Fertilizer Co.—is in the midst

of an expansion program which has already added 2,000 tons of capacity for bulk storage and wet-mixing equipment. Future plans include a new office building, and beautification of the plant area. Stanley Welch, manager of this plant is also in charge of the CC plant at Lockwood.

TEXAS

Best Fertilizers of Texas, affiliate of the California concern, has bought site and storage facilities and plans a \$500,000 program of expansion, according to Russell C. Dellinger, president. The land is a five-acre tract, and includes three large warehouses, shop and office. The program for the future includes a 300 daily ton mixing plant to be built within the next 18 months.

UTAH

Texas Gulf Sulphur's 2800 foot production mine shaft, being sunk by Harrison International, as reported here last month, is expected to reach potash in the Fall of 1962.

The \$30,000,000 plant itself is due to be in operation at that time. The Denver and Rio Grande Western Railroad will begin construction in August of the 39-mile spur which will serve the plant, and this is due to be ready by August of 1962.

The firm expects to reach a production rate of 1,100,000 tons of potash within a year of production start. Texas Gulf is budgeting about \$13 million for the potash project this year. The entire project is being financed out of earnings and working capital.

WYOMING

American Humates, Inc., headed by J. C. Karcher, Dallas, Tex. oil man, was only bidder for construction of a \$1 million fertilizer plant at Glenrock, Wyo., using soft lignite coal, it was reported May 5.

Large deposits of the lignite coal containing humic acid were leased by Karcher on 4,359 acres of federally owned land 18 miles north of Glenrock, paving the way for construction of the plant along railroad siding in Glenrock.

The firm previously obtained a state lease on 640 acres just north of the federal deposits.

The humic acid from the soft coal will be combined with nitrogen and phosphate, in pelleted form, which will be sold in bulk to large commercial fertilizer firms. A pound of the concentrated humus pellets, Karcher declared, will be equivalent to the fertilizer value of 1,000

lbs. of barnyard manure. The formula is expected to be around 16-8-4 with humic acid running 30%. Strip mining operations will start within a few weeks and plant construction is scheduled before Oct. 1. The facility will produce 75 tons of bulk concentrate commercial fertilizer daily.

Between 200 and 300 tons of coal will be mined daily, depending on the quality of the ore. Karcher will pay royalty of 15 cents a ton on coal produced from the federal land.

ALGERIA

Djebel-Onk phosphate works, a \$25,000,000 project in northeastern Algeria has gone into the construction stage. Owned by the Government plus private interests, the major shareholder being Compagnie des Phosphates de Constantine, the operation will have produced 50,000 tons of 75% phosphate content by the end of next year, and will reach 800,000 annual tons by 1964.

Total reserves are estimated at 500,000,000 tons, a fifth of which is in open pits. Raw ore, running no richer than 50% will be given roasting treatment at Djebel-Onk and then to the Mediterranean, coast, at Bone, to be ready for shipment. Treatment plants will cost \$8,000,000 and an electric rail line another \$9,000,000.

AUSTRIA

Donau-Chemie are building a sulphuric acid plant to turn out 80 daily tons at Moosbierbaum in lower Austria. The Italian combine—De Nora will handle construction to cost \$31,000,000 schillings, with production—on the Monsanto process—to start early next year.

* * *

Osterreichische Stickstoffwerke of Linz, upper Austria, in 1960 increased production by 3.3% to 1.1 million tons. At the same time the value of sales was 6% higher than during the preceding year. The value of exports remained virtually unchanged. The major part of nitrogen fertilizer, however, was exported (448,100 tons), while 220,300 tons were sold on the home market.

BRAZIL

Cia de Superfosfatos e Produtos Quimicos is establishing a plant in Capuavo, San Paulo to produce initially 40,000 annual tons of powdered or granular triple superphosphates. 150 daily tons of sulphuric and 40 of phosphoric acid will also be possible. Establissemments Kuhl-

***This familiar symbol
represents the
extra service behind...***



SWIFT'S MINUTE MAN PHOSPHATES

Phosphate Rock— Ground and Unground Triple Superphosphate

The people at Swift's modern Phosphate Center are anxious to serve you. These are friendly, cooperative people who not only know phosphates but know the importance of good service to you.

For example, Swift's Phosphate Center includes a Customer Service facility where, through the magic of a modern, precise control system, you can get accurate, up-to-the-minute information on cars shipped, car numbers, dates and routing. Like the Minute Man, a minute's notice is all that is needed to put the system into action.

You'll enjoy doing business with Swift's Phosphate Center... with dedicated people who want to serve you. Have a Swift Phosphate Center Representative outline the advantages Swift's service offers you in phosphates—triple, phosphate rock or ground phosphate rock.



..... THE SERVICE CENTER FOR ALL YOUR PHOSPHATE NEEDS.....

SWIFT & COMPANY
Phosphate Center • Bartow, Florida

To Serve Your Industry Better WITH MINUTE MAN PHOSPHATE ROCK, GROUND
PHOSPHATE ROCK AND TRIPLE SUPERPHOSPHATE

—Around the Map...

mann, Paris, will furnish plans and technical aid.

CANADA

Brackman-Ker Milling Company Ltd., of New Westminster, B. C. has announced the installation of a fertilizer mixing and packaging plant, to be located adjacent to their retail outlet in Langley, B. C.

This new and modern plant will have all facilities to provide a comprehensive line of standard packaged fertilizers, as well as custom mixtures. The already well established distribution facilities of B & K, which offers to customers, through their Fertilizer Field Service Department, soil testing, convenient pick-up depots and financing plans, will now have the added values of modern formulation and improved deliveries to round-out their customer services.

Management of the newly-created Brackman-Ker Fertilizer Division has been assigned to E. R. 'Mac' McCrady, qualified through education and background to carry out B & K concepts of quality and service. Plant operations will be under the supervision of Robert S. Hazlewood.

Weighing, screening and mixing unit for this new plant, incorporating the latest concepts of fertilizer manufacturing technology, is being designed and furnished by Stedman Foundry and Machine Co., Aurora, Indiana.

* * *

Imperial Oil's wholly owned subsidiary, Northwest Company, will carry out potash exploration work in Saskatchewan's Findlater and Regina Beach-Lumsden areas.

GREAT BRITAIN

Fisons, whom we have reported considering an Irish plant, have finally settled on South Wales, near the Esso refinery at Milford Haven. Esso and Fisons jointly own a company which will build a plant capable of 150,000 annual tons of ammonia. This will be piped to another new plant, wholly owned by Fisons, which will produce nitrogen products. Both plants are expected to be in operation by the Spring of 1964.

Hargreaves, Leeds, has completed the purchase of the minority shares in Liquid Fertilizers. The minority interest in the latter company was held by Agriform of Northern California, Inc., with which a close liaison will be maintained.

INDIA

Sindri is still suffering from what is announced as a shortage of the right kind of coal—but the Ministry promises things will be rectified by 1962.

* * *

Trombay is the first fertilizer plant in India to use refinery gas, and has a 10-year contract for 50,000 annual tons of gas, beginning on completion — expected no later than early 1964.

* * *

Gorakhpur construction is now scheduled to get under way soon after the monsoon. This plant is being set up with Japanese collaboration, with a team of nine Japanese engineers riding herd over the building and equipment. 100 technicians are to follow.

* * *

Kothagudam, to be based on coal with a capacity of 80,000 annual tons in terms of N, and an integral part of the Five Year Plan, may be transferred to the private sector.

* * *

West India Chemicals Private Ltd., has received a license from the Government for increasing the production of superphosphate from 20 tons to 100 tons a day. It is proposed to convert it into a public limited company in the near future. The company has sought the permission of the Government to increase its share capital by 400%.

INDONESIA

Three fertilizer plants will be built in Java, as part of the \$72,700,000 grant by the U.S. to Indonesia for a three year period, ending in 1963.

IRAQ

The Ministry of Industry expects to be in production by 1965 at Abi Flus, in Basrah, with its first chemical fertilizer plant — a veritable melting pot of sources: equipment from USSR; natural gas from the Rumailah fields; pipeline built by the Italian Government oil trust, ENI. The plant is designed to produce 116,000 annual tons of ammonium sulfate; 56,000 of ammonium nitrate; 20,000 of sulphuric acid.

ISRAEL

Dead Sea Works at Sodom began the first step of its planned increase in production, when the Dead Sea pipeline was dedicated May 14. The new six-inch pipeline will bring methane gas from the newly developed Rosh Zohar and Kodod fields, and is expected to help increase potash production from 160,000 tons this year to 600,000 tons in 1965 and 900,000 tons in 1970.

ITALY

Montecatini will build at Follonica a plant to be completed by June next year. It will produce 170,000 annual metric tons of iron ore, and 350,000 annual tons of sulphuric acid.

MALAYA

A multimillion-dollar fertilizer plant, to be run on a co-operative basis for Malaya's 800,000 farmers, will be built on a 300-acre site near Kuala Lumpur with UN aid.

NETHERLANDS

Fisons, Ltd., of Britain, is moving into the Common Market with the formation of a new fertilizer manufacturing company in association with Union Chimique Belge of Brussels. Called Fison UCB, S.A., the company will produce high analysis granular compound fertilizers in a plant at Zandvoort, which is near Ostend. Planned completion date is summer of 1962. The plant will produce 20 tons an hour, using a new process under development by Fisons.

PAKISTAN

Fenchuanj, the Pakistan natural gas fertilizer plant will go into trial runs in November. This plant is scheduled to produce urea, equivalent to 250,000 annual tons of ammonium sulphate. It uses gas from nearby fields that are estimated to be available for 20 years at the rate of 20,000,000 daily cubic feet. It will cost Rs 244,000,000. Japanese technicians are assisting.

* * *

Multon Fertilizer Factory is under fire again. N. M. Khan, director-general projects, has expressed grave concern over a further delay in completion of the plant, due on-stream originally in 1959. The Pakistan Industrial Development Com-

(concluded on page 66)

HIS BUSINESS IS MAKING YOUR BUSINESS BETTER

He's one of several hundred Cyanamid people who mine, process, research, deliver and service phosphatic materials for your acidulation and mixed fertilizer business. These people put Cyanamid's more than 40 years of phosphate experience into products and services you can use.

Services you can use

Traffic Service: Cyanamid traffic specialists are ready to route and ship your orders without delays. Their knowledge can save you money, and can make your operation run even more efficiently.

Technical Service: Cyanamid's staff of technical experts are constantly at your service. Make your formulation and production problems theirs. That's their job.

Sales Service: Cyanamid sales representatives are available to work with and for you in expanding present markets or in establishing new markets.

Products you can use

Cyanamid's phosphate business is the mining and manufacturing of the highest quality products for your mixed fertilizer requirements.

- Florida Natural Phosphate Rock.
- TREBO-PHOS® - Triple Superphosphate.
- Phosphoric acid - an economical source of P_2O_5 for high analysis fertilizers.

American Cyanamid Company,
Agricultural Div., N. Y. 20, N. Y.
®TREBO-PHOS is American Cyanamid Company's trademark for its triple superphosphate.



Cyanamid laboratory technician preparing samples in the quality control laboratory at Brewster, Florida.



CYANAMID SERVES THE MAN WHO MAKES A BUSINESS OF AGRICULTURE

PRICE MAPPING

— a management tool

In order to blend fertilizer at the lowest possible cost and still meet specified standards, it has been shown that it is possible to consider a wide number of source materials simultaneously by the use of linear programming.¹ Once an optimum (least cost) mix for a given grade or ratio has been calculated, we know with certainty that no other combination of materials will produce a lower cost mix. But a pertinent question arises: suppose that the prices of some of the important source materials used in the least cost mix change; will the optimum be changed? Some mixes are highly stable to changing prices while, in other cases, the optimum mix is quite sensitive to price changes. How then will a bulk-blend operator be able to ascertain this price stability or sensitivity to price change? A useful technique which can be used to answer this question is *price mapping*. The purposes of this article are to describe price mapping as a management tool and present an empirical application.

Basically a price map is a diagram showing the price areas relevant to optimum mixes resulting from price changes of any two source materials. In making a price map the stability of an optimum solution is determined. If the solution is highly stable then management can focus attention on other important organizational and operational functions. If the solution is sensitive to price changes then the efficient manager will investigate the possibility of changing his mix to conform with the least-cost objective.

As an example of price mapping the least cost mix for a 1-1-0 ratio

by ROBERT M. FINLEY
and JOHN I. BUCY

THE AUTHORS

Dr. Finley is assistant professor, Department of Agricultural Economics, University of Nebraska, Lincoln, Nebraska.

Mr. Bucy is extension associate, Department of Agricultural Economics, University of Nebraska, Lincoln, Nebraska.

is chosen. The objective is to determine the least cost combination of source materials listed in the accompanying table which will meet the requirements of the ratio.

By the use of the linear programming technique the least cost combination of materials is:

2,333 pounds of 30-10-0 (Ammonium Phosphate Nitrate)
1,667 pounds of 18-46-0 (Diammonium Phosphate)

The next question concerns the stability of the above solution if the prices of 30-10-0 and/or 18-46-0 change. Price mapping now enters the picture. Using the prices of 30-10-0 and 18-46-0 as variables the following map is developed. The map is divided into 4 areas (A, B,

C, D) indicating the least-cost solutions resulting from price changes of 30-10-0 and 18-46-0. Point 0 indicates the prices of 30-10-0 and 18-46-0 in the original least cost mix. Note that this point is in Area A. The mix of 2,333 pounds of 30-10-0 and 1,667 pounds of 18-46-0 is least cost for all price combinations of materials included in Area A. Note that while Point 0 is in Area A it also near the border of the other areas which indicates that relatively small price movements of one or both materials would result in the original mix becoming sub-optimum. For instance, suppose that the price of 30-10-0 increased from \$.03468 to \$.03800 while the price of 18-46-0 remained steady at \$.04550. Point M indicates the new prices. This point is located in Area B of the map indicating that a new mix is called for if the least-cost criterion is to be met. The optimum mix applicable to all price combinations in Area B is:

1.82 pounds of 33.5-0-0 (Ammonium Nitrate)
2.17 pounds of 18-46-0 (Diammonium Phos.)

Assume now that the original price of 30-10-0 remains stable at \$.03468 while the price of 18-46-0 increases slightly from \$.04550 to

Composition And Cost Of Fertilizer Materials Available

Fertilizer Materials	Units ¹		Plant Nutrient		Delivered Cost Per Ton (Dollars)	Cost Per Pound of Material (Dollars)
	N	P ₂ O ₅	K ₂ O	Total		
Ammonium Nitrate	33.5	0	0	33.5	65.66	.03283
Ammonium Sulfate	21	0	0	21	43.47	.02174
Urea	45	0	0	45	107.00	.05350
Ammonium Phosphate Nitrate	30	10	0	40	69.36	.03468
Diammonium Phosphate	21	53	0	74	107.56	.05378
Diammonium Phosphate	18	46	0	64	91.00	.04550
Ammonium Phosphate	16	48	0	64	104.00	.05200
Ordinary Superphosphate	0	20	0	20	30.00	.01500
Triple Superphosphate	0	46	0	46	62.56	.03128
Concentrated Superphosphate	0	54	0	54	66.80	.03340
Calcium Metaphosphate	0	62	0	62	77.29	.03865
Ammoniated Superphosphate	12	36	0	48	72.62	.03631
Ammoniated Superphosphate	16	16	0	32	56.00	.02800
Ammoniated Superphosphate	15	15	0	30	52.68	.02634

¹ A unit of plant food is 20 pounds or one percent of a ton.

¹ Douglas, John R., Bucy, John I., and Finley, Robert M., "Bulk Blending with Linear Programming," COMMERCIAL FERTILIZER AND PLANT FOOD INDUSTRY, November, 1960.

Common - Sense Application of The Extraordinary

Let INGLETT'S Experience And Facilities Bring You Top Efficiency And Economy... GREATER PROFITS!

INGLETT SPECIALIZES IN:

- ▶ BATCH-WEIGH SYSTEMS
(any required capacity)
- ▶ BAG FILLING & BAG LOADING SYSTEMS
- ▶ BULK MATERIAL STOCKPILING
AND LOADING SYSTEMS
- ▶ BULK MATERIAL UNLOADING AND
INVENTORY UNITS
- ▶ CUSTOM DESIGNED OR CONVENTIONAL
MIXING AND MATERIALS - HANDLING
EQUIPMENT

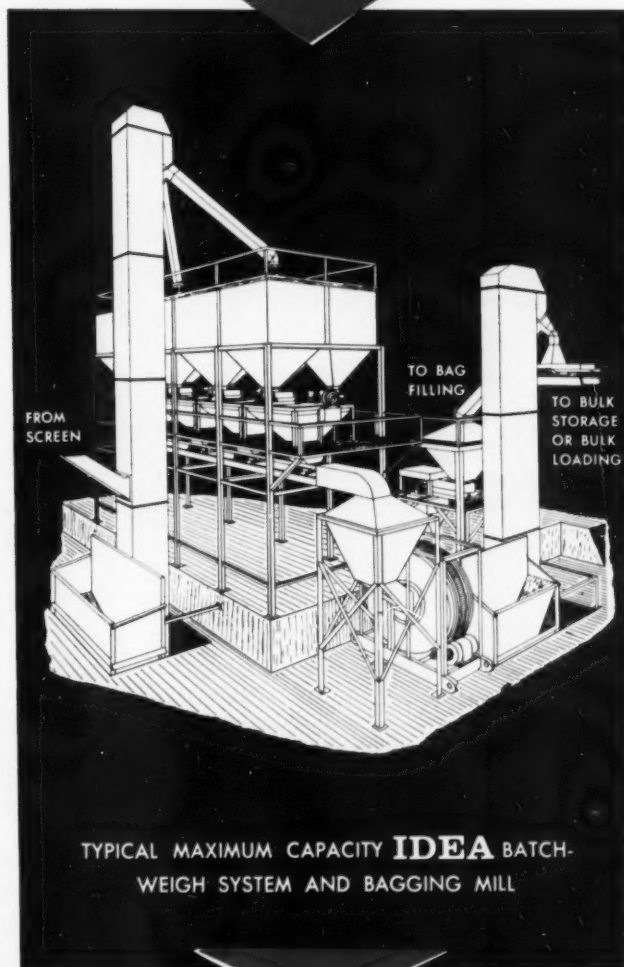
Let INGLETT Equipment help you solve the problem of rising labor costs and shrinking operating profits. INGLETT'S experience and know-how can save you hundreds of dollars . . . increase operational efficiency . . . and bolster sagging profits.

Regardless of the job — large or small — INGLETT will work with you to determine the system and the equipment that will best do the job for you. There is no obligation . . . NO FEE!

Let's Talk It Over



- NEW MACHINERY DEVELOPMENT
- BATCH WEIGHING AND MIXING SYSTEMS
- BAGGING & MATERIALS HANDLING SYSTEMS



TYPICAL MAXIMUM CAPACITY **IDEA** BATCH-WEIGH SYSTEM AND BAGGING MILL

WRITE, CALL OR WIRE

INGLETT

DEVELOPMENT & ENGINEERING ASSOCIATES, INC.
P. O. BOX 177 MARION BUILDING
AUGUSTA GEORGIA

PHONE: PA 4-9049

PRICE MAPPING

\$0.4800. These prices are depicted on the map by Point R which is located in Area D. The optimum mix for all price combinations in this area is:

3.333 pounds of 30-10-0 (Ammonium Phosphate Nitrate)

1.25 pounds of 0-54-0 (Concentrated Superphosphate)

It should be noted that the selection of optimum mixes is not entirely dependent upon the price ratios between 30-10-0 and 18-46-0. For example, the original ratio between the two prices is $\frac{.04550}{.03468} = 1.312$

and if prices increase proportionately 25 percent, the ratio remains $\frac{.05688}{.04335} = 1.312$. Point T represents the prices of the two materials when a 25 percent increase occurs. Point T is located in Area C and a different mix is dictated if the mix is to be least cost:

2.99 pounds of 33.5-0-0 (Ammonium Nitrate)
1.85 pounds of 0-54-0 (Concentrated Superphosphate)

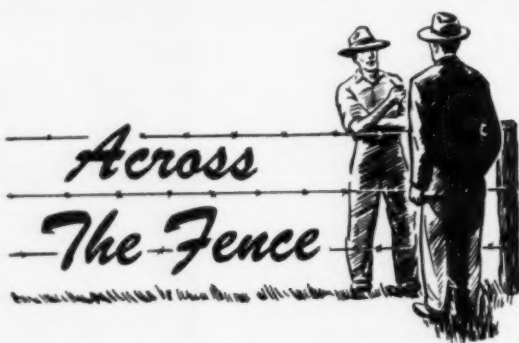
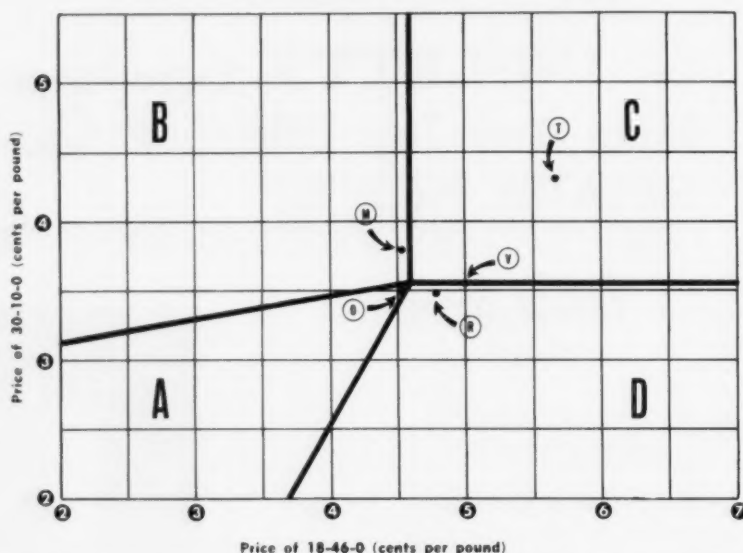
The reason for the new mix is that the competitive price positions of the other materials improve relative to 30-10-0 and 18-46-0 and hence a new mix becomes least cost.

If the point depicting the intersection of prices of the two variable ingredients occurs on one of the boundary lines between areas then the two mixes are equally least cost. For example, if the prices of 30-10-0 and 18-46-0 are \$.035585 and \$.050000 respectively, then the intersection on the map occurs on the boundary line between areas C and D (Point V). The mix designated as optimum in either area will be equally least cost in this particular case.

SUMMARY

The primary purpose of this article is to explain the price mapping procedure and present an example of mapping. The procedure will permit the examination of the stability of given least-cost solutions and further, will point out the new least-cost mixes when prices of principle ingredients change. Mapping should prove to be a money saving technique and along with linear programming should not be overlooked in calculating minimum cost problems. It is a precise tool and hence careful interpretation of results is necessary in order to utilize mapping advantageously as a decision-making aid to management.

A price map for a 1-1-0 fertilizer ratio with prices of 30-10-0 (Ammonium Phosphate Nitrate) and 18-46-0 (Diammonium Phosphate) as variables.



facts
to
help
you
sell

"Ten Commandments" for efficient corn production were listed by University of Wisconsin soils scientists: 1—Set yield goals at 90 to 120 bushels per acre on silt loam soils. 2—Sample and test your soils. 3—Fertilize and lime according to soil test recommendations. 4—Follow minimum tillage practices. 5—Use the best adapted variety or hybrid for your area. 6—Plant an adequate population—16,000 to 18,000 plants per acre. 7—Control insects. 8—Control weeds. 9—Harvest carefully. 10—Store properly.

Whether a farmer is in the Feed Grain program or not, he can boost his profits considerably by using fertilizer on his corn this year. The extra bushels of corn per acre from sound fertilization can give you the best return, even if they are above the allotment and fail to qualify for price support," says NPFL.

"The fact is that these extra bushels can be highly profitable for the farmer because they can be produced at a low enough cost so that the open market price will return extra profit. Experience has shown that the extra bushels farmers get from a few dollars more investment in improved practices, such as fertilizer, cost less to grow and return more 'take-home' income."

Dr. L. S. Robertson, Michigan State University soils scientist, points out that high-yielding corn produces extra tons of stalks and leaves which are the raw material for making humus in the soil.

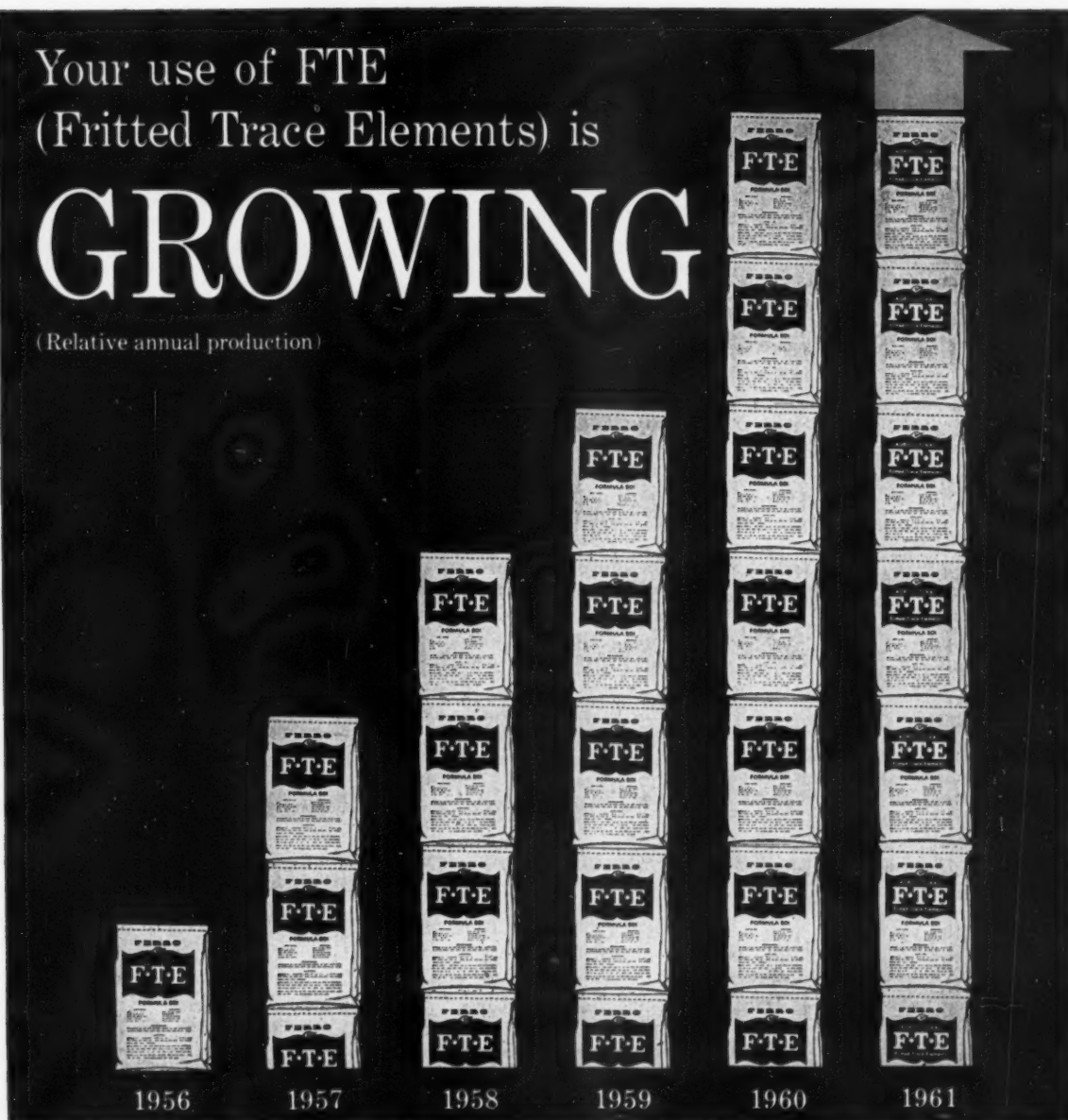
"If you plow this stover under and use the right amounts of fertilizer nutrients, particularly nitrogen, your soil will have abundant supplies of organic matter," he says.

"Thus the corn can be part of a good soil conservation plan if you use good management practices."

Your use of FTE
(Fritted Trace Elements) is

GROWING

(Relative annual production)



Controlled Solubility makes it different...better

Where trace elements are needed, FTE is consistently winning new friends. As a source of *boron . . . or manganese . . . or iron, zinc, copper and molybdenum* it is unsurpassed. Combining all *six* in a single product, it produces excellent results—often with no more than 1% mixed into good fertilizers.

Unlike soluble salts that leach out in heavy rains, or become fixed in the soil under certain conditions, FTE releases the nutrients as needed. "Fritting" makes possible *controlled, predetermined solubility*.

This, in turn, makes fertilizers more productive, much more predictable.

While *two* standard formulas are available, and others are being developed for specific areas of the country, all can be *safely used anywhere*, and on *any crops*, simplifying manufacturing and marketing for our fertilizer customers.

If you are not fully informed about FTE, let us tell you about it. Better yet, *try* FTE in your fertilizers this season. We'll be happy to work with you.



FERRO CORPORATION *Agricultural Division*

4150 East 56 Street • Cleveland 5, Ohio

IMC sponsors repeat performance of Fertilizer Management Seminar

Some 65 fertilizer industry executives will have an opportunity to call in a group of specialists and then sit back and watch them solve their problems this summer at a three-day Fertilizer Management Seminar to be sponsored by International Minerals & Chemical Corporation.

The sessions on July 19, 20, and 21, at IMC's headquarters in Skokie, Illinois, will tackle a case history that covers 10 broad topics of executive concern — administrative management, financial management, insurance, purchasing, transportation, personnel development, public relations, marketing, production, and future growth possibilities.

The program is built around the hypothetical "Makmor Fertilizer Company" and the problems encountered by President Will I. Makmor and his staff.

A full-scale report on the company, including financial data, will be sent for advance study to those attending the Management Seminar. Use of the "Makmor" case history technique assures practical subject matter, presented in terms and examples which the executives can apply at their own plants.

In addition to the formal program, John Baker, director of Agriculture Credit Services, U. S. Department of Agriculture, will give the principal address at the banquet session on July 20. His topic will be "The Administration's Agricultural Policy and Program."

This year's seminar is a repeat of the successful three-day event held last summer which drew favorable comment from some 55 fertilizer company executives from all parts of the country.

The Management Seminar is a natural outgrowth of the two series of sales training clinics for customers' personnel conducted by IMC in a program for bringing modern marketing weapons to the attention of the fertilizer industry.

Many of those attending the earlier clinics suggested the need for a concentrated management training meeting as the next logical step in IMC's Full Orbit customer service program. Their request was fur-

ther endorsed in comments by IMC's 12-member Fertilizer Industry Advisory Panel.

Each topic will be explored in a 30 to 45 minute presentation by top officials of IMC and their staffs, with a 10-15 minute question period following. Highlights of each session:

Administrative Management — Definition of management. The basic steps: listing objectives, organization structure, setting up the organization, assigning responsibilities, measures and controls, and motivation and incentives.

Financial Management — Profit planning; possible reasons for reduced profits; production costs; accounting; and credit and collections.

Insurance — Kinds of insurable risks to which business is exposed, maximum loss exposure for each risk, eliminating hazards, workmen's compensation, plant safety program, "hidden" costs of plant accidents.

Purchasing—New equipment vs. used equipment; buying vs. leasing; keeping suppliers up to date on needs; supplier relations in times of short supply; asking about additional services suppliers can offer; sources for finding suppliers.

Transportation — Distinction as a cost of business; examination of all types of transportation (rail, truck, barge); procedures in rate cases; loading, warehousing, and routing studies.

Personnel Development—Important factors in raising employee productivity; recognition of the various motivating forces; effective selection and placement, on-the-job training; "understanding" employees vs. pampering.

Public Relations—Problems of the fertilizer manufacturer in community relations and press relations; importance of telling the fertilizer manufacturer's story; means of community participation; learning the needs of editors; preparing news releases.

Marketing—The modern marketing concept defined; determining sales potential; plotting trends by grades; the advertising budget and

campaign; sales training, product knowledge, and sales compensation; sales and dealer meetings; the formalized marketing calendar.

Production — Efficient formulation, daily production problems, fertilizer shrinkage.

Future Growth Possibilities — Products and processes for the future; new forms of nitrogen-phosphate-potash mixtures; distribution changes.

\$170,000,000 Planned As Plant Investment

New and expanded fertilizer chemicals production facilities in the U. S. alone call for a two-year expenditure of \$178,000,000 in 1960 and 1961. \$78,58,000,000 of this is already under way; \$46,770,000 were completed in 1960. \$99,900,000 is earmarked for early ground-breaking.

NPFI Pushes Non-farm Fertilizer Uses

Recognizing the rapidly increasing suburban market for fertilizers, NPFI has developed a well-rounded program for fertilizer in non-farm use. Commercial Fertilizer Magazine published last February a typical study of the NPFI series, which has now reached into five U.S. regions, and which shows consumption of non-farm plant foods, not only by regions, but by typical communities. It also breaks down sales by grades, size of package and other information pertinent to marketing planning by the industry.

On the promotional side, NPFI is planning a 16 mm motion picture, for personal presentation and with a TV version, teaching lawn establishment and maintenance.

A recorded special, featuring Dr. W. H. Garman, NPFI's chief agriculturalist, speaking on the subject is being made available as part of the Farm Radio New series. And Dr. Garman has written a series of five articles on the subject, suitable for newspaper and magazine use. These are headed: Have a good lawn this season . . . Tips for lawn care . . . Build a new lawn right . . . Tips for specialized turf areas . . . Tips for measuring fertilizer.

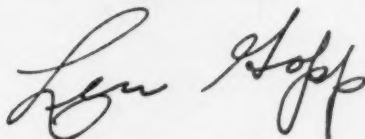
INTEROFFICE CORRESPONDENCE

TO: all department heads

FROM: L. W. Gopp, vice president

We've just closed the books on another fine fiscal year. This last twelve-month period has been one of our most successful to date and we've been unusually fortunate in signing additional new contracts.

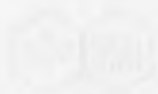
More than ever I feel that the continued growth of our business reflects confidence in our people and in our products and services by an imposing list of customers. I feel, also, it is our individual responsibility -- at every level of the corporation -- to show, in an active way, our appreciation for this business. I encourage you to continue to look for new and improved ways to extend still further the IMC concept of total service.



Len Gopp



THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION
PUBLISHED WEEKLY
CHICAGO, ILL., U.S.A.
Subscription price, Five Dollars Per Annum in Advance
Single Copies, Fifteen Cents
Entered as Second-Class Matter, May 2, 1917
Postpaid
Acceptance for mailing at special rate of postage provided for in Act of October 3, 1917
Authorized by Act of October 3, 1917
Copyright, 1918, by American Medical Association
Printed at the American Medical Association, 535 North Dearborn Street, Chicago, Ill.
No. 10,000



SULFURIC ACID

WE ARE BASIC PRODUCERS



SERVING THE GROWING SOUTHEAST

The Sulfur contained in the Ore we mine yields Virgin Sulfuric Acid of highest quality. We produce all grades of Sulfuric Acid from 60° Baume through the various Oleums.

Call Jackson 3-5024, Atlanta, Georgia, or write



TENNESSEE CORPORATION

612-629 GRANT BUILDING, ATLANTA 3, GEORGIA

Nitrogen Division

Dr. G. Coli has been appointed director of development for Allied Chemical Corporation's Nitrogen Division, it was announced today by Frank O. Agel, vice president of research and development.



Coli

Dr. Coli has been chief engineer at the division's Hopewell, Va. plant since 1959. Before that he was assistant principal chemical engineer and director of operations engineering. He joined Allied Chemical in 1950.

Five other appointments were also announced by Mr. Agel.

Promoted in the division's development center at the Hopewell, Va. plant were: Samuel W. Grossman from manager of estimating to chief engineer; Irving F. Anderson from manager of chemical engineering to director of construction and economic evaluation; William W. Hoeving from manager of operations engineering to manager of chemical engineering; William J. Michels from supervisory engineer to manager of evaluation; William H. Wright from supervisory engineer to manager of operations engineering.

W. R. Grace

W. R. Grace & Co., Nitrogen Products division, announces the appointment of Burton L. How, Jr. as Chicago district sales manager with offices at 75 East Wacker Drive, Chicago, Ill. Mr. How was formerly Anhydrous Ammonia



How

product manager at the Nitrogen Products division headquarters in Memphis, Tenn. He joined W. R. Grace & Co. in 1953 and was for two years in the New York office before moving to Memphis in 1955 when Grace's ammonia and urea facilities came into production.

As Chicago district sales manager, Mr. How will be responsible for ammonia and urea fertilizer and feed urea sales in the states of North Dakota, South Dakota, Nebraska, Iowa, Minnesota, Wisconsin, Michigan, Ohio, and the northern half of Illinois and Indiana.

PEOPLE in the

Dorr-Oliver

John W. Walborn has been appointed manager of the Dorr-Oliver plant at Hazelton, Pennsylvania. He joined them in February, from his previous position as manufacturing manager for Farris Engineering. A mechanical engineer, he has had 25 years of production and plant management experience.

Dorr-Oliver has transferred Harry Harrison from engineering to pump sales division. His new job is to provide technical assistance to the 14 Dorr-Oliver pump distributors in the U.S. He came to D-O from the predecessor company, United Filters, where he had been since 1943, and has specialized in pump engineering.

U. S. Steel

Charles W. Bourg has been named industry representative—agriculture,



Bourg

market development division of United States Steel, it was announced by Robert C. Myers, director of market development for the Corporation.

Mr. Bourg comes to Pittsburgh from Salt Lake City, Utah, where he had served as a market development representative since Jan. 1, 1956, when he joined United States Steel.

Collier Carbon

Prior to joining United States Steel Mr. Bourg served with the Curry Chemical Company, Scotts Bluff, Neb., which later became a division of Phillips Petroleum Company.

Hercules Powder

R. H. McGough has become president of Western States Chemical and John A. Foster replaces him as general manager of agricultural chemical sales at Collier Carbon and Chemical. Western is 60% owned by Pacific Guano, which Collier recently purchased.

Swift

James E. Elder became industrial chemical sales manager of Swift & Company June 5, it was announced by W. F. Price, general manager of the company's agricultural chemical division. The new post was created to provide improved



Elder

customer service.

Mr. Elder started his Swift career in the Atlanta plant food division in 1934. From 1936 until 1956 he held various sales, operational and managerial positions in the company's plant food division in Atlanta, Houston, New Orleans, Chicago and Albany, Ga. He was then assigned to the president's staff in Chicago for further management training.

Gilman Paper

Howard Gilman, executive vice-president of Gilman Paper Company, announces the promotion of Simon Posen to the office of vice-president in charge of special assignments. Mr. Posen joined Gilman in 1949 as director of the New York technical department. He has functioned importantly in the company's expanded manufacture of pulp, paper and converted products, in company-customer relations, and in the development of bleached sulphate board, bleached and unbleached specialty papers and many by-products.

Stuart Bergman, for the past six years assistant director of the technical department, has been promoted to director of technical services.

Western Mineral

Bruce E. Chevalier has joined the Terra-Lite division of Western Mineral Products Co., Minneapolis, vermiculite processors, it was announced by E. C. Petersburg, division manager.

Mr. Chevalier will represent the company in Iowa, Nebraska, Colorado, and Wyoming, with headquarters in Omaha, Neb. He was formerly associated with Procter & Gamble and with Johnson & Johnson.

INDUSTRY

Texas Gulf Sulphur

Election of E. F. VanderStucken, Jr. as a director of Texas Gulf Sulphur Company was announced by Claude O. Stephens, president, at the annual meeting of stockholders.



VanderStucken

Mr. VanderStucken resigned as vice president and secretary of Texas Gulf Sulphur in January 1961. He joined the company in 1936 and served as secretary from 1955 and vice president from 1957. He has been retained by the company as a consulting attorney.

Superior Fertilizer

G. Dexter Sloan, founder of Superior Fertilizer and Chemical, Winter Haven, Florida, has retired as president, but will remain on the board. He is succeeded by D. A. Hunt, board chairman and a major stockholder, but will not be active in management. James S. Wood, who has been general manager and board member becomes executive vice-president and assumes all management duties.

Arizona Fertilizer

Ted W. Swift has been named a vice president, and Joseph G. Hartsig an assistant vice president of Arizona Fertilizer. Mr. Swift joined them in 1938, Mr. Hartsig ten years later.

Commercial Solvents

Walter C. Berger, former administrator of the Commodity Stabilization Service and executive vice president of the Commodity Credit Corporation of USDA, has been elected to the board of directors of Commercial Solvents Corporation, it was announced May 9, by Maynard C. Wheeler, president.



Berger

Mr. Berger is an authority in the planning and management of broad national farm programs. He has

taken a leading role in agriculture and allied industries for more than 30 years.

DuPont

Chester E. Graves, manager of the Palo Alto, Calif., biochemicals sales district of the Du Pont Company's Industrial and Biochemical Department, will retire July 1, 1961, after 32 years with the company. He has represented Du Pont on the West Coast for the past 16 years. Jack R. Nail, export sales manager of the department and formerly in sales work in the West, will return to Palo Alto and assume the duties of district sales manager.

Int. Fert. Development

International Fertilizer Development Corp., an affiliate of International Ore & Fertilizer Corp., 500 - 5th Ave., New York 36, N. Y., announces the appointment of Christopher J. Pratt, as vice-president in charge of operations.



Pratt

Mr. Pratt is a chemical engineer by profession, and has been associated with Dorr-Oliver Inc., Stamford, Conn., as project engineer, specializing in the design of plants for the manufacture of fertilizers and heavy chemicals.

Coleman Instruments

Roland M. Waters was appointed to the new position of marketing director of Coleman Instruments, Inc., designer and manufacturer of scientific instruments for chemical analysis. David L. Hackler was named Advertising and Sales Promotion manager. Mr. Waters had been marketing manager of Radiation Counter Laboratories, Inc., Skokie, Ill.; Mr. Hackler had served Coleman as a technical writer.

These appointments, effective May 1, 1961, were announced by Douglas P. Crane, president of the Coleman organization.

Central Resources

Robert L. Fiss, formerly of United States Steel Export Company, has joined Central Resources Corporation in New York. He will be active in this company's rapidly expanding international fertilizer activities, handling various types of nitrogenous, phosphatic, potash and compound fertilizers involving exports from the United States as well as off-shore movement between other producing nations and the various markets. The announcement was made by Leonard Linton, vice president of Central Resources.



Fiss

Bemis

Thomas K. Warner, formerly manager of the Stamford, Conn., offices of Price Waterhouse & Co., has been elected comptroller of Bemis Bro. Bag Company, it was announced by Judson Bemis, president. Mr. Warner joined Bemis at its St. Louis headquarters offices on June 1.

Michigan State

Dr. R. Gaurth Hansen has become head of the newly established Michigan State department of biochemistry—which combines the biochemistry section with the agricultural chemistry department of the University.

Central Chemical

Frank B. Springer, Jr., has been appointed technical service representative for Central Chemical Corporation, Hagerstown, Maryland. Mr. Springer succeeds W. T. Brown who has assumed a Central sales territory in Maryland, Virginia and West Virginia.



Springer

Mr. Springer, formerly assistant agronomist at the University of Delaware, will assist all ten Central Chemical sales offices in experimentation and promotion of Farmrite agricultural chemicals.

—Industry People...



Ortho Division of California Chemical Company, Richmond, California, has just formed a national fertilizer group to handle marketing and distribution. The formation of the group is directly connected with the entry of the Ortho Division into the fertilizer marketing area of the Northern United States, the new fertilizer facility currently under construction in Fort Madison, Iowa, is due to be completed late this year. The men in charge of the Ortho fertilizer program are: (above, l. to r.), Dr. M. H. McVickar, Chief Agronomist; L. R. Hamilton, Asst. National Manager, Fertilizer Sales; William E. Jaqua, National Manager, Fertilizer Sales.

Ortho Division

Robert K. Bonnett, Jr., has been appointed lead engineer at the Fort Madison, Iowa, ammonium phosphate fertilizer plant of California Chemical's Ortho Division. He previously had been an engineer with the firm's refinery in Salt Lake City. Before joining California, he had been employed in an engineering capacity with Shell Chemical Co. at Martinez, Calif.

U.S. Borax

Barry A. Frazee, a former instructor in economics, marketing and advertising, has been made sales representative in Texas, Oklahoma and New Mexico by U. S. Borax & Chemical.

David W. Goldsmith has joined the company at Boron, California, as senior process engineer, it has been announced by Dr. D. S. Taylor, vice president in charge of the firm's technical department. Mr. Goldsmith was formerly associated with American Potash & Chemical Corporation, Potash Company of America, and Kaiser Aluminum and Chemical Corporation.

Farm Bureau Co-op

Howard T. Maloney has been appointed office supervisor of the fertilizer manufacturing department of Farm Bureau Co-operative, Columbus, Ohio. He was acting manager of the firm's Glendale plant in 1959 and manufacturing and shipping supervisor at the Dayton plant last year.

Cyanamid

Dr. L. Patrick Moore has succeeded Jerrold H. Ruskin as president of Arizona Chemical. Mr. Ruskin is now general manager of Cyanamid's industrial chemicals division.

Burton F. Bowman has become president of Cyanamid of Canada, succeeding Dr. Moore.

American Cyanamid also has appointed D. D. Bondarenko as research agronomist for the Agricultural Division, it was announced by C. D. Siverd, division general manager. Dr. Bondarenko reports to the director of plant science research, F. L. Stark.

Hayes-Sammons

Hayes-Sammons Chemical Co. Directors of Mission, Texas, have elected Thomas B. Sammons, Jr., secretary. He remains chairman and chief executive officer of the company. Cornelius Vanderulis, senior vice president, was elected treasurer. They replace Edward H. Metz, who resigned, it was announced by Claborn B. Brazeal, president. Joe Wallace was appointed chief accountant.

University of Massachusetts

Dr. Arless A. Spielman has been named director of the Agricultural Extension Service of the University of Massachusetts, effective July 1.

He also will serve as dean of the College of Agriculture and director of the Agricultural Experiment Station.

Spielman succeeds Dr. Dale H. Sieling, who resigned to become director of the U. S. Army Quartermaster Research and Engineering Command at Natick, Mass.

Dr. Spielman has been associate

director of the Experiment Station at the University of Connecticut since 1949.

Clark Equipment

Appointment of Fred Dolton as manager of national account sales for the "Michigan" line of tractor shovels is announced by A. E. York, sales manager, Construction Machinery division of Clark Equipment Company.

Mr. Dolton's new duties include coordination of sales between Michigan construction and bulk materials handling equipment distributors throughout the nation and the national account sales force. His headquarters remain at 485 Lexington Avenue, New York.

Prior to this assignment, Mr. Dolton was national account sales representative for the Construction Machinery division of Clark.

Obituaries

L. W. Davis, Swift & Co. agricultural chemical division manager, in Portland, Oregon, died April 25, following a heart attack.

John William Hansen, 76, died May 2, in Clearwater, Florida. He was a lifelong fertilizer man, and officer and manager of several fertilizer and associated concerns in Wisconsin and Virginia. He was a close personal friend of the late founder of Commercial Fertilizer Magazine, Walter W. Brown.

Charles E. Simmons, sales supervisor for Smith-Douglass Co. at Statesville, N. C., died May 1, following a heart attack.

AGRICULTURAL EDITORS VISIT GRACE RESEARCH CENTER

W. N. Watmough, Jr. (left) and D. N. Hauseman (right), vice-presidents of W. R. Grace & Co. Davison Chemical Division, with members of the American Agricultural Editors Association at an inspection of Grace's Washington Research Center facilities at Clarksville, Md. The tour was taken in connection with the association's annual meeting in Washington. Mr. Watmough is in charge of mixed fertilizers for Davison; Mr. Hauseman of agricultural chemicals.



Another Technical Advance from West Virginia



BALEX™

**The New, Tougher,
Lower Priced Baler**

BALEX is a new and superior single ply shipping container made from a new, extra heavy kraft Clupak* extensible paper. It will outperform any single or double wall baler bag currently available, yet cuts costs up to 10%. If you ship almost any dry product—in pockets or in bulk—it will pay you to get the whole story on BALEX.

BALEX is the newest in a growing number of developments by West Virginia to provide better bags at lower cost. Some of the other recent technical advances are:

Impactape™ closure—drastically reduces sewn-end bag failure by adding four layers of tape to the sewn end.

Kraftsman™ Clupak extensible paper—pioneered the unique “stretchable” kraft that cuts bag breakage.

WONDERWALL™ bags—developed the technical knowledge needed to convert Clupak extensible paper into better and less expensive bags where lighter or fewer plies do more work.



**West Virginia
Pulp and Paper**

Whatever your bag problem, we invite you to put it up to us. Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, New York.

*Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications.

Multiwall Bag Division, Dept. T462
West Virginia Pulp and Paper Company
230 Park Avenue, New York 17, New York

Gentlemen: Please send me more information on:

☐ Balex ☐ Kraftsman CLUPAK extensible paper
☐ Impactape ☐ WONDERWALL Multiwall Bags

For _____
(Product)

Name _____

Company _____

Street _____

City _____ Zone _____ State _____

The International Scene

FRANCE

Chemical production up

An appreciable increase in French chemicals production was registered in 1960, according to recently released official figures: For a selected list of mineral and organic chemicals, comparison between 1960 and 1959 output shows: sulfuric acid, 1,983,200 tons versus 1,826,400 tons; carbonate of soda, 847,900 vs. 776,400; solid soda lime and electrolytic soda, 263,090 vs. 207,600; nitrogen, 723,800 tons vs. 633,600; calcium carbide, 447,460 vs. 346,920; chlorine, 331,430 vs. 275,160; acetone, 48,776 vs. 38,124; methanol, 69,550 vs. 46,440; distilled phthalic anhydride, 29,420 vs. 25,920.

INDIA

Million tons of N fertilizers

The fertilizer industry survey mission sent by the UN Technical Assistance Board to India has recommended that four new fertilizer projects, each with a capacity of 85,000 tons of nitrogen, should be commissioned during the third Plan. It has suggested that these should be located at Gorakhpur, Ankleswar, Ennore or Tuticorin and Mangalore. The mission's recommendations are now being examined by the Commerce and Industry Ministry. The mission said the four projects should be given priority so that by the end of the third Plan, India would be able to produce one million tons of nitrogenous fertilizers. The raising of food production by 35 per cent by 1966 depended on a greater use of commercial fertilizers. There should be an all-out campaign to educate farmers about the advantages of using fertilizers.

Prices to be reduced

The Food and Agriculture Minister, Mr. S. K. Patil, assured the Lok Sabha that the prices of fertilizers would be reduced substantially shortly.

Mr. Patil said that the Government did not want to make any profit on the sale of fertilizers. Some profit had been made in the past. During 1961-62, he said, 66% of the requirements of 2.3 million tons of

nitrogenous fertilizers would be met. The requirements of tea and coffee plantations and jute growers would be fully met, as they were foreign exchange earners.

On the food front, Mr. Patil said, "we have positively turned the corner and laid the foundations of a stable, self-sustaining and self-developing economy." All the credit for the increased production should go to the Indian farmers.

To try new fertilizer

The Indian Council of Agricultural Research will receive a gift of 2,000 tons of calcium-ammonium nitrate from the Nangal Fertilizer Factory for certain experiments.

The experiments are designed to estimate the effect of this comparatively new type of fertilizer and to determine the dosage with reference to soil conditions and irrigation facilities for different kinds of crops.

Calcium-ammonium nitrate is stated to be the most suitable for use in Punjab, U.P. and Rajasthan.

ITALY

Fertilizer exports doubled

Italy's exports of chemical fertilizers have more than doubled over the past five years. Not only has that sector of the chemical industry improved and expanded its production facilities, but through research it has developed considerably improved products.

During 1959 alone, investment in the fertilizer sector of the chemical industry reached nearly \$234 million. New facilities have been built in the depressed areas of Southern Italy and Sicily. The industry has concentrated on development of the most economical methods for use of natural gas as both a power source and a raw material for the production of synthetic nitrogen and ammonia.

The total value of Italian fertilizer exports was only \$24 million in 1955. By 1959 it had risen to \$51.5 million.

Principal buyers of Italian fertilizer exports are the countries Eastern Europe, the Middle East and the Far East.

JAPAN

Supply enough for export?

Japanese chemical fertilizer makers have set the export goal for chemical fertilizers in fiscal 1961 at 1,364,000 tons, valued at \$71 million.

This constitutes a 24 per cent increase in value over the past fiscal year when estimated actual achievement ran to \$57,244,000 for an overseas shipment of 1,207,000 tons.

The export target for nitrogenous fertilizers was put at \$65 million involving a total of 1,205,000 tons, that for phosphatic fertilizers at \$5,700,000 and others at \$300,000.

The ammonium sulphate export was set at a figure of 800,000 tons.

Japanese fertilizer men, who had expressed misgivings over the possible effects of the U. S. dollar economy move, have now shaken off their worries and believe they can readily fulfill or even top their export goals for the current year.

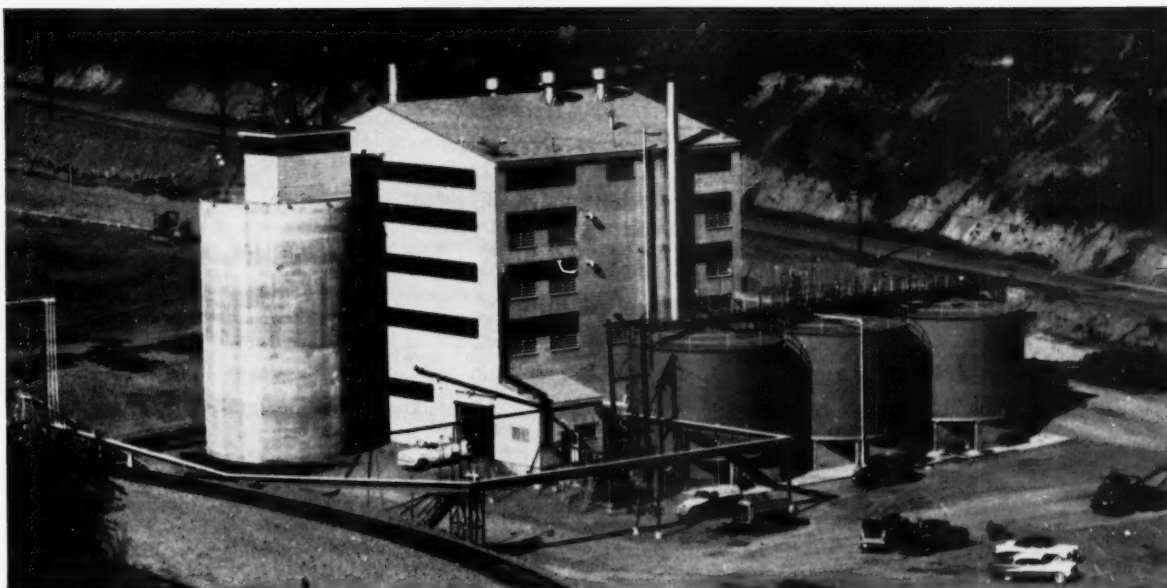
Developments during the past month, during which sizable export contracts for ammonium sulphate and urea were signed, have led them now to express concern as to how they can smoothly tie-in foreign demand with seasonal domestic requirements.

SOUTH AFRICA

Enough phosphate for centuries

A large industrial centre in the Eastern Transvaal lowveld was predicted by Dr. S. P. du Toit Viljoen, vice-chairman of the Board of Trade and Industries, at Tzaneen. He said that the Union would soon be able to produce all the necessary basic fertilizer materials with the exception of potash. Even imported potash could be replaced by locally processed slag. Supplies of phosphates were "sufficient for our requirements" for a few centuries.

In the Letaba district, one of the richest ore-bearing formations in the world was found, said Dr. Viljoen. These minerals would form the basis of one of the largest industrial concentrations in the border areas—the Palabora Mining Company.



Aerial view shows the complete Phosphoric Acid Plant of The Bunker Hill Company at Kellogg, Idaho. Three 35' Dorr Storage-Clarifiers are seen in the foreground.

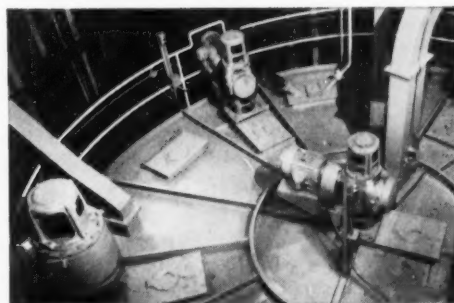
SO₂ from zinc plant opens way for phosphoric acid production at THE BUNKER HILL CO.

Another example of Dorr-Oliver engineering

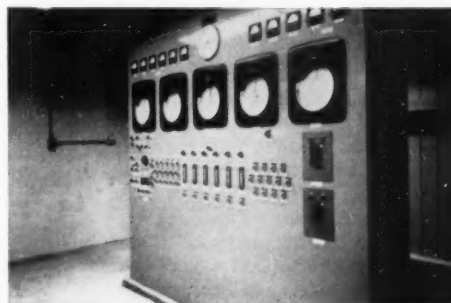
Operated in conjunction with the Company's important zinc reduction facilities nearby, the new Phosphoric Acid Plant of The Bunker Hill Company, Kellogg, Idaho, was constructed in 42 weeks, put into production in January this year, and very quickly achieved capacity and efficient operation. The plant has a design capacity of 130 tpd of 54% P₂ O₅ product acid (70 tpd P₂ O₅).

The Dorreo Strong Phosphoric Acid Process is used, utilizing Western phosphate rock and sulphuric acid manufactured from SO₂ gas from the zinc plant roasting operation. Complete engineering, plant design, purchasing of equipment and supervision of erection and initial operation were handled by the Dorr-Oliver organization.

Selection of Dorr-Oliver was based on over 40 years of experience in constructing wet process P₂ O₅ and complete fertilizer plants throughout the world. For information on the complete range of D-O engineering services available to the Fertilizer Industry, write to Dorr-Oliver Inc., Stamford, Connecticut.



Top view of newly-developed Dorr-Oliver Single Tank Reactor used in this plant for the first time.



The entire plant operation is controlled from this central instrument panel.



DORR-OLIVER

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

Escambia to Sell Own Nitrogen Products

Ashcraft-Wilkinson Company and Escambia Chemical Corporation have jointly announced that effective July 1, 1961, Escambia will assume responsibility for the sale of its nitrogen products manufactured at Pace, Florida.

Ashcraft-Wilkinson, who has been exclusive sales agents for Escambia in both the fertilizer and industrial markets, will continue to represent Escambia during the current fertilizer season as its exclusive sales agents, and will render any assistance possible to Escambia and customers of Escambia's nitrogen products during the transition period.

The association between Ashcraft-Wilkinson and Escambia has been in existence since Escambia was founded in 1955.

Escambia's nitrogen sales and technical service organization will be headquartered in Atlanta, with sales representatives located in the Southeast marketing area served by its plant. This change will bring the responsibility for the sale of all of Escambia's products directly under the supervision of Escambia's sales department.

Ashcraft-Wilkinson will continue to serve the fertilizer industry as a supplier of a wide range of fertilizer materials.

Fisons Export Unit Reorganized

Fisons has announced plans for a new export drive. For this purpose, Fisons Chemicals (Export) has been reorganized and its name changed to Fisons Overseas. The Overseas company will control the overseas activities of all companies in the Chemical division.

Sir Clavering Fison, the chairman of the Group, announcing the new export drive, pointed out that already overseas sales of the Chemical Division accounted for nearly 40 per cent of total chemical sales. One of the chief aims of the Overseas company would be to raise exports still higher, particularly in South America and the U.S. It would also be responsible for the licensing of Group products for overseas manufacture.

Gilman Paper Moves to Rockefeller Center

On May 1 the Gilman Paper Company and its subsidiaries, moved

CHANGES

their offices to the Time & Life Building, 111 West 50th Street, New York 20, N.Y. The new telephone number is CIRCLE 6-3300.

The Austin Company Forms Process Division

Allan S. Austin, president of The Austin Company, international engineering and construction firm with headquarters at Cleveland, Ohio, announced May 23 the formation of a new division to provide a complete range of specialized service to the fertilizer and chemical process industries.

James E. Iliff has been named manager of the new Process Division. M. Rex Wingard has been named division sales manager, and Harry M. Betzig has been named assistant division manager. All three men were formerly officers of Davidson-Kennedy Associates Company. They have offices at the Process Division's new headquarters at 2719 Chicago Avenue, Chicago Heights, Illinois. (Also see Around the Map item on page 29 under Minnesota.)

Ortho Consolidates Eastern Districts

California Chemical Company, Ortho Division, announced the consolidation of its mid-Atlantic and western New York districts, effective May 1. According to M. E. Wierenga, Ortho's marketing manager and vice-President, the move will give the company more effective customer contact and will result in administrative and equipment economies. Agriculturally, the company's grower service for the Ortho line of pesticides and herbicides will be enhanced and the large garden & home market covering 15 states will be serviced centrally from the district headquarters at Haddonfield, New Jersey.

Manager for the district is Dr. Robert T. Wallace, formerly managing the mid-Atlantic district. Dr. L. L. Pechuman, former district manager of western New York, will hold a responsible position as senior research representative with Ortho Research and Development, report-

ing to Leo R. Gardner, vice president and manager of Research and Development. Dr. Pechuman will headquarter at Medina, New York, representing both the Ortho Marketing and Research departments on new products development covering eastern Canada and the eastern United States.

The increased emphasis on outdoor living and gardening and the increasing awareness of growers for the need of scientific crop production were largely responsible for the formation of the new district. This consolidation is carefully planned to facilitate service and distribution of the Ortho line to millions of commercial growers and homeowners in the northeastern and middle Atlantic part of the United States.

Foxboro to Acquire Waugh Engineering

The Foxboro Company, Foxboro, Massachusetts, has announced plans to acquire the assets of Waugh Engineering Company of Van Nuys, California, manufacturers of electro-mechanical and electronic instruments, in exchange for 12,806 shares of its common stock. The firm will be operated as a division of The Foxboro Company and will continue under the direction of its founder, Charles C. Waugh. No changes in personnel are anticipated.

R. A. Bristol, Foxboro executive vice president, emphasized that Waugh products—particularly turbine flow meters—are an important addition to the extensive Foxboro line of measuring and controlling instruments for the process industries.

The new Waugh division provides a second manufacturing facility for Foxboro on the West Coast. Additional Foxboro establishments include a branch factory at San Leandro and sales offices at Alhambra, California, Seattle, Washington, and Portland, Oregon.

U. S. Borax to Market Ferro FTE

The Ferro Corporation of Cleveland, Ohio has appointed U. S. Borax as its national sales representative for the marketing of its fritted trace fertilizer supplement, FTE, in the domestic fertilizing industry, it is announced by Gene L. Burton, general manager of the Ferro Agricultural Division.

FTE has been under development by Ferro in cooperation with several state agricultural experiment stations for more than 10 years with the objective of offering slowly soluble, multi-trace elements of known composition and controlled solubility.

With the plant food industry steadily increasing the content of the major elements in fertilizers, there is a growing need to supply essential secondary and trace elements as additives to insure complete plant food mixtures for healthy crop growth.

J. F. Corkill, U.S. Borax marketing vice president, said that the agreement with Ferro will provide improved sales and distribution facilities for FTE and will round out the line of fertilizer borate materials supplies by U.S. Borax.

Spencer Expands International Activities

Spencer Chemical Company has expanded its program to market Spencer products on a world-wide basis and to seek foreign investment opportunities. John C. Denton, president, said May 18 that all sales agreements under which Spencer products have been marketed by U. S.-based export agencies have expired and that Spencer Chemical International, a wholly-owned subsidiary formed in 1958, has taken complete charge of the company's overseas operations.

Mr. Denton said the move is a planned expansion of the company's overseas marketing program and added that the manufacturing and/or distribution of products not now produced by the parent company in the United States are included in the scope of activities which Spencer Chemical International will undertake.

To complement these plans, Mr. Denton said Carl Flesher, a former deputy director for the International Cooperation Administration, has joined Spencer to head a program aimed at seeking out profitable capital investment opportunities overseas. Mr. Flesher will be located at

Spencer's general offices in Kansas City.

President of Spencer's International subsidiary is Albertus Slingerland, a native of Holland, who joined the company in 1958 to help plan and establish foreign operations. Mr. Slingerland has established coordinating offices for Spencer Chemical International in Luxembourg.

Spencer Chemical International has entered into an agreement with the domestic company to market agricultural chemicals, industrial chemicals, and plastic products. Spencer Chemical International will also market products supplied from other sources through its own facilities and those of affiliated corporations.

At Spencer Chemical International coordinating offices in Luxembourg, E. F. McGill will be chemical products manager, heading agricultural and industrial chemicals sales. R. L. McAllister will be plastic products manager and F. Q. Packheiser will be technical manager. In Lima, Peru, C. W. Brooks will be manager of Latin American sales. S. P. Horkowitz will represent the company with an office in Tokyo and Kurt F. Schroder will direct European sales.

Tower Iron Works Occupies New Plant

Tower Iron Works Inc. has announced opening of its new plant and office facilities located on Tower Road in Seekonk, Massachusetts. Situated on a 57 acre site their new facilities are comprised of a 100,000 foot steel framed shop with aluminum siding.

Modern equipment in the plant features automatic flame cutting and punching machinery. The latest semi-automatic and automatic welding machines for steel, aluminum, stainless steel and alloys, are used along with special work positioners and manipulators.

The separate office building is a steel frame, glass wall one story structure.

This New England firm has been in the metal fabricating and warehouse business since 1835. Equipment for chemical process industries is manufactured and sold by Tower throughout the United States and world markets.

Bartlett-Snow Purchased By Pacific Foundry

Pacific Foundry and Metallurgy Co. of San Francisco, California has purchased The C. O. Bartlett & Snow Co. of Cleveland, Ohio. The new corporation, according to the

— Changes . . .

announcement by Robert L. Chambers, president of Pacific, will be known as Bartlett-Snow-Pacific.

Pacific Foundry and Metallurgy Co. is a manufacturer of furnaces used for processing various ores and chemicals; it also produces high-silicon iron pipe and fittings, and special heat, abrasion and corrosion resistant castings.

The C. O. Bartlett & Snow Co. is a manufacturer of dryers, calciners, kilns, coolers and conveying and elevating equipment.

The Pacific Division of the new corporation will continue to be located at 3100 Nineteenth Street, San Francisco 10, California; the Bartlett-Snow Division in the company's former plant and offices at 6200 Harvard Ave., Cleveland 5, Ohio. Sales offices will be maintained in principal cities.

Badgerland Liquid Joins Kickapoo Fertilizer Group

Midwestern Farm Fertilizers, Inc., Stevens Point, Wisconsin, has announced purchase of the assets and the trade style of Badgerland Liquid Fertilizers, Almond, Wisconsin.

"Established in 1956, Badgerland is the largest liquid fertilizer manufacturer in the state of Wisconsin," said R. B. Baldrige, executive vice president of Midwestern.

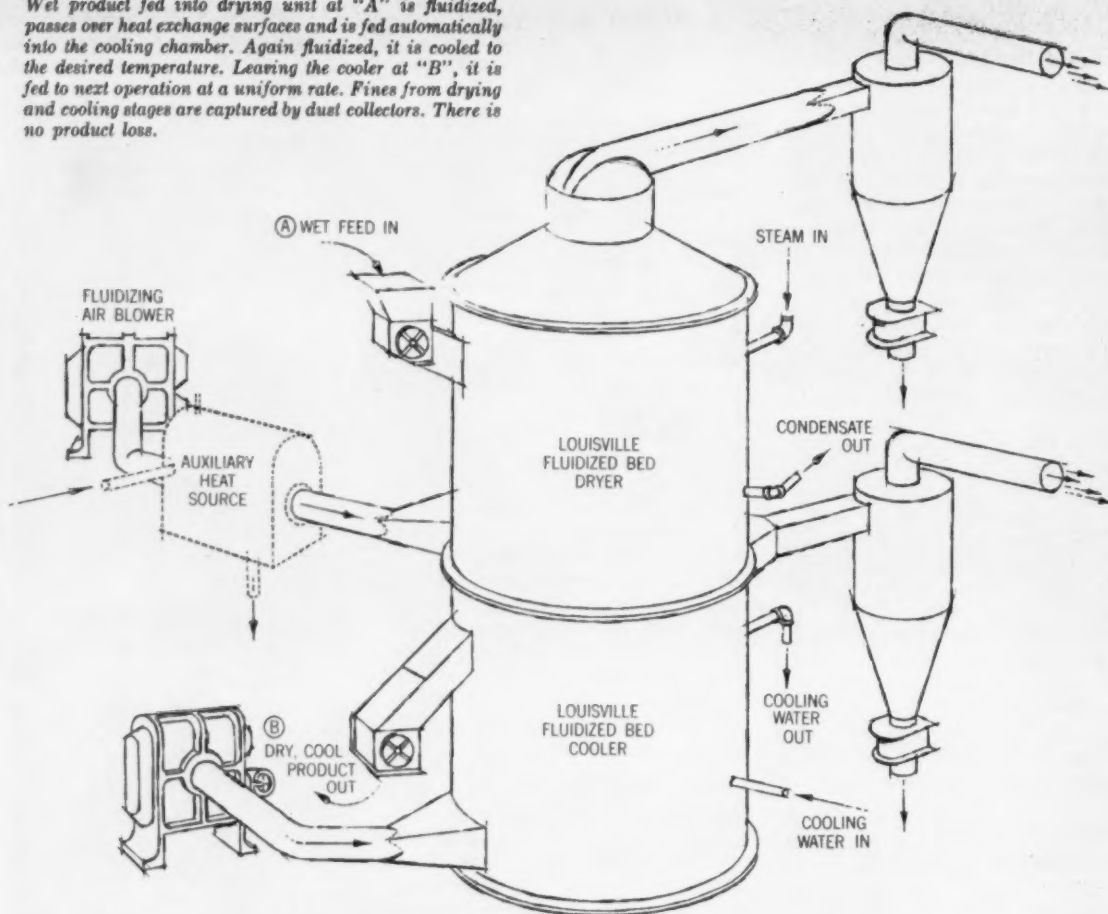
Midwestern is the manufacturer of Kickapoo and Badger brand fertilizers. Kickapoo has operations in Wisconsin at Stevens Point, Hillsboro, Almond and Gratiot. Badger brand, a subsidiary of Midwestern, has operations at Kenosha, Burlington and Shiocton. The home office of Midwestern is located at Stevens Point.

The new acquisition, Badgerland, will be known as Kickapoo Liquid Fertilizers, and has operations at Oxford, Portage, Randall and Mazomanie, with the main plant being located in Almond, Wisconsin.

FAO Reports on African Grass Cover

The UN's Food and Agriculture Organization has published a 168 page report, "The Grass Cover of Africa" which comes complete with a 31 by 36 inch map in color, showing the areas involved in the various types of grass. This document is available in this country from International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y.

Wet product fed into drying unit at "A" is fluidized, passes over heat exchange surfaces and is fed automatically into the cooling chamber. Again fluidized, it is cooled to the desired temperature. Leaving the cooler at "B", it is fed to next operation at a uniform rate. Fines from drying and cooling stages are captured by dust collectors. There is no product loss.



Major Break-Through in Drying and Cooling Techniques for Prilled and Granulated Fertilizers Announced by **GENERAL AMERICAN**

A new system for drying and cooling ammonium nitrate prills, urea prills and granulated mixtures has been perfected by General American through their development of Louisville Fluidized Bed* Equipment. Vertically coupled units functioning as a two or three stage dryer and cooler provide a continuous operation. Dust losses due to attrition are negligible as the material is cushioned by the fluidizing air. High heat transfer permits lower operating temperatures, preventing case hardening and resultant locked-in moisture.

*Patents Pending

For full details about this revolutionary development in drying techniques, write for bulletin #FBD-61

Louisville Fluidized Bed equipment offers these advantages:

1. Accurate, instantaneous temperature control
2. High heat transfer that permits compact design
3. Low maintenance costs (no moving parts)
4. Less cleaning time and labor
5. Less floor space (equipment is vertical)
6. No hot spots (product is fully protected)

Because of their simplicity, Louisville Fluidized Bed dryers and coolers adapt readily to complete automation.

Process Equipment Division—Louisville Dryers
GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street
Chicago 3, Illinois
Offices in principal cities



Family farms will be bigger and more highly specialized in 1975—and they will continue to dominate our Nation's agriculture.

This conclusion comes from a recent analysis, by ARS agricultural economist H. L. Stewart, of prospective changes in farming during the next 15 years. The analysis was based in part on data obtained in a larger USDA study to assess the job of agriculture and agricultural research in meeting future needs. (See also *Agr. Res.*, February 1961, p. 3).

Findings indicate that farmers will continue to step up adoption of labor-saving and output-increasing techniques. They will purchase additional equipment needed for more complete mechanization of crop production and livestock feeding operations. They will also hire more services, such as spraying, dusting, and fertilizing, and obtain more professional management assistance, including help in buying and selling livestock.

Greater use of these production materials and services will help farm operators to increase the size of their enterprises—without losing their control of management.

Changes in size of farm enterprises between now and 1975, the agricultural economist believes, will vary considerably, depending on type of operation and geographic location.

Dairy farms will continue to increase in size and decrease in number. Many small herds will gradually be absorbed by dairymen able to invest the extra capital necessary to meet stricter sanitation requirements and to obtain advantages of larger scale operation. Even so, Stewart believes, dairying in 1975 will still be largely a family-operated business.

Exceptions will be those having unusual location and specialization advantages, such as the drylot dairies in southern California. A few dairy farms may be integrated with a feed business, whose primary interest is maintaining feed sales volume.

Average number of cows on family-operated dairy farms may increase 25 to 30 percent by 1975. This is about the same percentage increase that occurred during the past 15 years. Farms with stanchion barns will probably average 30 to 35 cows, and farms equipped with loose housing may average as high as 40 to 50 cows.

Dairymen in the Northeast will probably intensify forage production at the expense of grain pro-

Family farms in 1975?

BIGGER

and more specialized

duction and buy more concentrates. In the Midwest, they will likely increase production of forages and grains.

Other livestock farmers also will take advantage of labor-saving techniques and specialization to reduce unit production costs. Stewart says, however, that reductions in unit costs usually tend to level out within the size range of family farms.

USDA studies, for example, have shown that unit costs on a large-scale livestock farm are only 5 percent lower than such costs on a comparable 1-man farm. In an Illinois Agricultural Experiment Station survey in northern Illinois, optimum use of land, labor, and capital was found on farms of 260 to 339 acres.

Hog, rather than beef, production may expand in the Corn Belt

In the Corn Belt, limited forage supplies will encourage some livestock farmers to expand hog production rather than beef production. Labor requirements, as well as capital and managerial limitations, will prevent expansion to the 1,000 or more hogs that one man can raise. But 500 to 600 hogs per farm (compared to an average of 170 today) may be commonplace by 1975. Hog producers will increase feed grain supplies by shortening crop rotations and using more fertilizer. But they will need to buy additional concentrates.

Corn Belt farmers not in position to expand hog production may put greater emphasis on beef cattle in an effort to increase efficiency and meet market demands for uniform quality of products. Other farmers in the area may discontinue all livestock enterprises. Many of these operators will take off-farm jobs and shift to cash-crop production as a part-time operation.

Cattle ranches, Stewart believes, will change less in the next 15 years than Corn Belt livestock farms, because ranchers are already highly specialized and have few production alternatives. But these primary producers of feeder cattle will need to increase volume of business and develop uniform product quality to

meet specifications of order buyers and contract feeders.

Large-scale livestock feeding will become increasingly important in the West and Southwest, where expanding markets coincide with abundant supplies of livestock, feed grains, and supplemental forage. But the size of these enterprises will be checked somewhat by managerial limitations and associated risks and uncertainties. Farm-sized feeding operations will continue to predominate in the Midwest because of the availability of farm-grown feeds and otherwise unmarketable operator and family labor.

More contract production expected in broiler and egg industries

Vertical integration will almost surely dominate the broiler and egg industries. Production in 1975 will be largely under contract—with producers providing labor, housing, and equipment, and contractors making many of the managerial decisions.

Size of broiler flocks may increase as much as four-fold by 1975. Egg-laying flocks will probably average between 6,000 and 10,000 birds, and many egg producers may stock as many as 35,000 to 50,000 birds.

Cash-crop farms of 1975 will be affected primarily by market limitations and by financial risks associated with yield uncertainties. Mechanization has greatly increased the size of crop-farm a family can handle. But major cost reductions, beyond those now possible with a balanced set of mechanized equipment, are more limited than is sometimes supposed. For example, an Iowa Agricultural Experiment Station study showed a Corn Belt cash-grain farm of 240 acres is large enough to allow significant cost reductions.

Specialized wheat farms will probably change less by 1975 than any other major type of farm. Large-scale drylot cattle feeding enterprises are attracting considerable attention in some wheat areas, where farmers are growing feed grains on excess wheat land. The agricultural economist doubts, however, that livestock production will become a primary enterprise on wheat farms in the foreseeable future.

'Cost on Ground' Will Decide Who Gets Fertilizer Business

Whichever segment of the chemical industry can put plant food "on the field or in the furrow" at the lowest cost "will dominate the future," was the statement made last month at an international meeting of chemical engineers by M. D. Sanders, of the Agricultural Chemical Division of Swift & Company, Chicago.

His paper, 'Summary of Technology in the Chemical Plant Food Industry,' was presented during a joint meeting of the American Institute of Chemical Engineers and the Chemical Engineering Division of the Chemical Institute of Canada, held at Cleveland, Ohio.

Up to now, Mr. Sanders explained to the engineers, the chemical plant food industry has consisted of two major divisions: the producers of the basic materials, and the mixers and granulators of complete NPK plant foods who buy all their raw materials from the basic producers.

Recently, however, "three additional routes from basic producers to the consumer have made their appearance:"

1. Some producers of phosphates have also become basic in nitrogen, resulting in marketing of ammonium phosphates direct to consumers as well as to mixers and granulators.
2. Some producers of nitrogen have gone the nitro-phosphate route to complete NPK plant foods.
3. Innumerable small, highly localized operations are now formulating liquids from phosphoric acid, ammonia and soluble salts, or dry mixing granulated and sized nitrogen, phosphate and potash materials to grade or to prescription, often coupled with an application service.

"Which of the four methods of serving the consumer will dominate the future, in the last analysis, depends on the final cost of the food as applied in the furrow or on the field. Lower cost per ton of plant food in large, integrated plants may be counterbalanced by higher average freight to the consuming areas.

"We, therefore, may see one route from primary producer to consumer dominate in one area, and lag behind in another, depending on the

logistics of phosphate rock, sulfur, natural gas and potash salts."

Must Produce More to Stay Competitive

A sharp rise in production will be necessary if a company in the chemical processing industry is to maintain its competitive position in 1965 and 1975, George W. Blum, of the Goodyear Tire & Rubber Company, Akron, Ohio, warned a joint meeting of the American Institute of Chemical Engineers and the Chemical Engineering Division of the Chemical Institute of Canada, at Cleveland, Ohio last month.

"Sound economic appraisal within the chemical process industries has been accompanied by conflicting conditions during the past sev-

eral years," he reported in a paper, Analysis of Capital Cost and Re-payment for Industrial Expansion.

"In order to maintain its present competitive position in the industry, a company will be required to produce about 40% more in 1965 than it did in 1955, and by 1975, must produce 100% more than in 1955, with only about 1/10 more hours worked. In 1955 every American at work supported himself and one and one-half other people. In 1975 each working American produces sufficiently to support himself and three and one-half people, in order to maintain the 1975 standard of living."

Mr. Blum pointed out that his estimates were based on the assumption of stable social conditions and "do not provide for the vast increases which would be made necessary should international conflict or more intense police action occur."

Retired Fertilizer Plant Owner

Invents Specialty Applicator

R. L. Colson, veteran in the fertilizer field and owner of the Marine Feed and Fertilizer Company of Gulfport, Miss., for the past 30 years, has invented, patented and is now demonstrating a new Soil Treating Machine. Mr. Colson closed his fertilizer business some time back to devote full time to the development of this unit.

Designed for use primarily on golf greens, lawns and parks, the machine aims to solve the problem of the fertilizer blowing or washing away and of getting the fertilizer to the grass roots.

Country club grounds maintenance worker demonstrates Mr. Colson's new machine.



Pushed and powered like a power mower, its fundamental principle is a steel drum 24 inches wide which rolls over the surface to be fertilized. Mr. Colson says the 24-inch width was determined, after experimentation, to be the width that will best follow ground contours.

The drum is covered with 70 hollow tines. These tines do the double duty of aerating the soil and shooting liquid fertilizer into the ground—under a pressure of 40 to 60 pounds—which immediately spreads out from the point of entry, deep enough into the ground for 100% utilization of the fertilizer.

Longer tines can be put on the machine if a deeper penetration is needed to get down where the roots will have to reach down for their nourishment rather than try to reach up when surface fertilization is used. Being inserted straight into the earth the liquid fertilizer cannot be washed away by a heavy rain or blown away by a high wind or evaporated by the sun.

In the case of golf greens it can be utilized not only to inject liquid fertilizer under the ground surface, but can be also used to inject insecticide into the ground, and dur-

(concluded on page 71)

RAYMOND ROLLER MILL

Today's HI-EFFICIENCY Fine Grinding Unit

for producing all grades of
PHOSPHATE ROCK

THE Raymond Roller Mill with Whizzer Air Separation provides a modern automatic dust-free system for making the specified grades and finenesses of phosphate rock, required for acidulation, acid manufacture and direct application. In the past 15 years, more than 200 of these Raymond installations have been put into service.

Recent developments in the C-E Raymond line of pulverizers now make available considerably larger units with capacities in the range of 50 to 60 tons per hour in a single unit.

The wide acceptance of Raymond Mills by the industry is mainly due to the following advantages, which add up to record economies, year after year.

1. Lowest initial cost, power cost and overall operating costs.
2. Dependable, long service life, backed by more than 70 years' experience.
3. Ability to handle all known deposits with a wide range of capacities available.
4. Automatic dust-free operation with a very minimum of attention.
5. Optimum particle size distribution and ease of fineness control.
6. Ability to dry, grind, separate and convey the material in one simple operation.
7. Minimum space requirements and flexibility to meet plant layout.
8. Low maintenance.
9. Active research and development over the years by Raymond to further improve grinding efficiency.
10. Competent engineering and operating service.



With a grinding problem in this or a similar field, get in touch with Raymond engineers for estimates and recommendations.

Write for Raymond
ROLLER MILL
CATALOG No. 79F



RAYMOND SUPER ROLLER MILL
CONSERVES PLANT SPACE
CENTRALIZES OPERATIONS
SIMPLIFIES MATERIAL HANDLING

COMBUSTION ENGINEERING, INC.
Raymond Division

427 WEST RANDOLPH ST.
CHICAGO 6, ILLINOIS

Combustion Engineering-Superheater Ltd., Montreal, Canada

SALES OFFICES IN
PRINCIPAL CITIES



Your nearby authorized Continental Conveyor Distributor can furnish the right equipment for your materials handling job — from stock, or from a nearby Continental Conveyor warehouse. Genuine Continental Conveyor components are backed by more than 127 years' experience in designing and manufacturing quality equipment for American industry.

Ask your distributor for the big Continental Conveyor Belt Conveyor Data Book — 88 pages of easy-to-use information.



Call on your
CONTINENTAL CONVEYOR MAN
for help on materials
handling problems.

Continental
CONVEYOR & EQUIPMENT CO.

Winfield, Alabama

Sales Offices in: ATLANTA BIRMINGHAM
DALLAS HUNTINGTON MEMPHIS
NEW YORK

Formerly Industrial Div., Continental Gin Co.

—of This and That...

William Caspari, Jr., general sales manager, agricultural chemicals, of W. R. Grace & Co. Davison Chemical Division, was honored by one hundred friends and associates from many parts of the U. S. and Canada, May 19, at a dinner in the Sheraton Belvedere Hotel, Baltimore, to mark his retirement on May 31, after 44 years of service with Davison, the only company for which he has ever worked. While he is retiring from active duty on May 31, he will continue with the company in a consulting capacity.



CASPARI

Mississippi Chemical Corporation, Yazoo City, will celebrate the tenth anniversary of the first ton of anhydrous ammonia manufactured there on June 21. Employees of the \$18,000,000 farmer-owned industry will receive the first \$50 of their pay in silver dollars and the balance in \$2 bills during the month of June. The company plans to meet all payrolls for the month on June 16 and all employees are asked to pay their bills as quickly as possible in order to dramatize the money circulating in the community as a result of the company's being there.

Norbert B. Van Buren, general manager of Eastern Hemisphere Operations for California Chemical Company, has been awarded the highest honor the French government bestows on a non-countryman in recognition of his contributions to industry and agriculture in France and his efforts to promote Franco-American friendship and cooperation. The Knight's Cross of the Legion on Honor was conferred on Mr. Van Buren by the President of France, General Charles De Gaulle, by a presidential decree on April 8, 1961. He is one of the few United States citizens to receive the award in the 150 years since its organization.

The Louisville, Ky. chapter of the American Marketing Association has elected as its new president James M. Miller, advertising manager of Federal Chemical Company.

The push-button, fully-automated farm of tomorrow will be equipped with a driverless "chore" tractor, directed around the barnyard by an electronic tape on which the farmer has listed his orders for the day. In the dairy barn, cows will move obediently through a milking line in which everything including the attachment of milking machine is done by automated equipment.

In the field across the road, an irrigation system, untended by man, will turn itself on because a "sensing" block, buried in the earth, has reported to control devices that soil moisture is low. The control machine, checking a taped weather forecast, will make sure that no rain is expected before sending electronic orders to the irrigation system. This look at the farm of the future came with publication of USDA's annual "best seller", the yearbook of agriculture. The 1960 yearbook, titled "Power to Produce" is a 480-page report on the technological revolution in agriculture, and the outlook for the future.

The farm income picture is looking rosier . . . Federal officials have figured that net earnings will rise to about \$13 billion in '61. This would be the highest level since '58 . . . last fall, observers predicted that farmers would put only \$11.6 billion in the cookie jar this year.

They're using ordinary sugar to kill destructive crop pests these days, thanks to recent discoveries by Government scientists . . . the new treatment, which does away with the microscopic nematodes that attack corn and almost everything else, is just too expensive for widespread use, though. It takes several tons of sugar, mixed with each acre of soil to kill all the pests . . . however, researchers figure the treatment could be useful in gardens and greenhouses.

A permanent zone for farm use has been proposed by a nationally known planning expert to preserve the dwindling acres of "green spaces" remaining in Maryland's Montgomery and Prince Georges Counties. Harland Bartholomew, civil engineer engaged by the Maryland-National Capital Park and Planning Commission as a consultant, urged the establishment of an agricultural district on three master plans for sections of Montgomery. He declared that such farm zoning was "perfectly logical" because the county has 493 square miles, of which 62 now are in urban use. The estimated doubling of population in Montgomery by 1980 would occupy another 62 to 75 square miles of land now being farmed, he estimated. "This means that only about 125 to 150 acres will be in urban use with approximately 350 square miles not required for development and within which "scatteration" of suburbs should be prohibited," Mr. Bartholomew said.

INSIDE:

1. Hazen-Williams C-Flow Factor of 147.
2. Handles 94% of Known Corrosive Solutions.
3. Operating Temperature Range is: -65° to $+300^{\circ}$ F.
4. Operating Pressure Range Extends to 1200 psi.



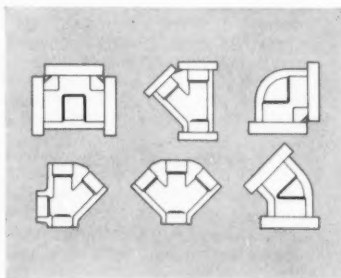
OUTSIDE:

5. Combats Corrosive Environments.
6. Effectively Stops Electrolytic Action.
7. Fibercast is Unaffected by Extremes of Heat or Cold.

How Fibercast pipe is better built to combat corrosion...*inside and out!*

Years of research and development have perfected the most versatile pipe tested for heat, pressure and corrosive applications. Years of actual field use prove its long service life! Here are the reasons why:

1. FIBERCAST has a ceramic-smooth interior with a Hazen-Williams C Flow Factor of 147. Aids flow, resists deposit build-up.
2. FIBERCAST handles 94% of all known corrosive solutions. It is not impaired by acids, alkalis, salts, other damaging chemicals.
3. FIBERCAST withstands any temperature range from -65° to $+300^{\circ}$ F. This is a wider operating temperature range than any non-metallic pipe.
4. FIBERCAST provides superior resistance to high pressures. Its operating range extends to 1200 psi.
5. FIBERCAST has built-in inhibitors that combat the most highly corrosive environments and seals out contaminants.
6. FIBERCAST provides resistance to high tension forces. It is inert—stops electrochemical corrosion, forms an extremely durable dielectric shield.
7. FIBERCAST is unaffected by summer heat or winter cold; has superior resistance to severe atmospheres and weathering.

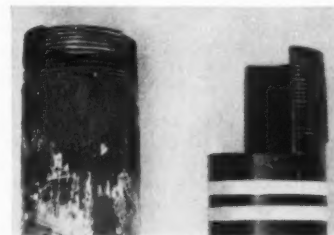


Fibercast has the world's most complete stock of standard fittings, as well as couplings designed and made to order for individual requirements.

The effectiveness and long-term durability of Fibercast pipe are the result of built-in inhibitors—high tensile glass fibers, imbedded and bonded by heat in epoxy resin, and centrifugal casting. It gives Fibercast a high degree of smoothness, ruggedness, permanence—and superior resistance to exposures involved in the most difficult corrosive, pressure and temperature conditions.

Reliability with true economy is built in—inside and out—and throughout the inner core of the casing thickness. This unique combina-

tion of benefits is not found in any other kind of pipe: rubber, glass, plastic, steel, stainless, aluminum, asbestos, brass or copper tubing.



Fibercast Tubing (right) used to suspend a 1,200 lb. pump for 3 years in a salt water supply well. *There was no loss in strength.* The damaged plastic-coated steel nipple (left) was used in the same installation, failed after 3 months' service.

Fibercast is available for all lines from 2" tubing through 8" pipe for service from -65° to $+300^{\circ}$ F. For more information mail coupon.

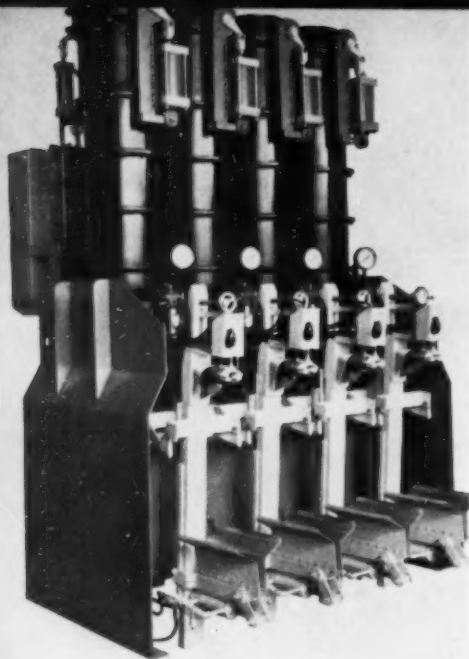
FIBERCAST
A DIVISION OF
Youngstown
COMPANY
SHEET AND TUBE COMPANY

FIBERCAST COMPANY

Box 727, Sand Springs, Oklahoma

Please send me further information about Fibercast Tube and Pipe. CF-61

Name _____
Firm _____
Title _____
Type of Business _____
Address _____
City _____ Zone _____ State _____



New Valve Bag Packer

A new multiwall valve bag packer which can handle an extremely wide range of powdered and granular free-flowing materials is available from St. Regis Paper Company.

Called the Force Flow packer, it features a pressure chamber which "densifies" materials so they pack faster and provide a more tightly filled bag. This permits higher production output, greater packaging economies and for many products, a reduction in bag size.

Fertilizer is one of the many products already being packed on Force Flow packers in the field. In addition, free-flowing materials of over 100 different kinds, grades and densities have been successfully packed on the machine at St. Regis' bag packaging laboratory.

The Force Flow is easily adjustable for quick changeover to different products and different bag sizes. The machine, which can handle 25- to 100-lb. sewn or pasted valve bags, is available in one- to four-tube models. Up to 28 bags per minute can be packed on a four-tube model.

An extremely clean filling operation is provided by three special machine features: an expandable rubber sleeve on the filling tube which seals off the valve of the bag during filling, an automatic time delay in the filling cycle, and controlled venting of each bag after filling.

Weight accuracy is excellent, being within plus-or-minus four ounces on most products. A poise weight control within easy reach of the operator simplifies weight adjustment.

The Force Flow is easily operated. It is push-button controlled and requires only one operator. Since bag filling and discharge are automatic, the operator merely places the empty bag on the filling tube and presses a start button to begin the filling cycle.

The Force Flow packer is com-

new literature about equipment, materials and supplies

pletely pneumatic. It is also explosion-proof, since it has no electrical components. With no rotating parts, and few moving parts, maintenance costs are low.

The head room requirement for a standard machine is 7' 9 1/4". Air requirements for the control circuit are 1.5 cfm of free air at 80 psi per cycle under average conditions. With positive displacement blowers average air requirements for pressurization and fluidization are approximately 50 cfm at 10 psi.

For additional information, circle number 1 on CF's Information Service card, page 57.

Vibration Inducers

Martin Engineering Company, originator of the 'Vibrolator' line of vibration inducers, announces a new permanent mount style for its high amplitude series of vibration inducers. Designated DVP and available in five sizes, these vibrators are the most powerful known for their weight.

These 'Big Shake' vibrators are used for the most difficult jobs requiring applied vibration. Silent operation will qualify this series for operation in areas where noise is a problem.

Air motor operation is standard in all sizes in a choice of gasoline, hydraulic and electric drives. Air models may be safely exposed to any weather condition, are not harmed by dust or high ambient temperatures, and never lose their tremendous power.

All sizes are controllable by use of an air line regulator allowing speeds from 100 to over 8,000 RPM, according to the application, a wide range of amplitudes, forces and frequencies permit easy tests to determine the right vibrator for the job. As with all 'Vibrolator' vibration inducers, the DVP series is available for 30 day free trial.

Available on request is a 42 page catalog showing 52 sizes, types and 4 motive powers. Just circle number 2 on CF's Information Service card, page 57.



Pellet Hardness Tester

The Pfizer hardness tester is a unique new tester for quickly and accurately determining the hardness of chemical tablets, as well as pellets and other caked or compressed materials, and is now available to general industry to test and control the hardness of caked or compressed industrial chemicals, pharmaceutical tablets, fertilizer pellets, animal food pellets, and many other industrial products.

The Pfizer Tester is shaped somewhat like a pliers with a dial gauge. As the sample is squeezed between two anvils the maximum pressure in pounds and kilograms is recorded on the dial. Most tests take less than five seconds. A stop watch type indicator remains at the breaking reading until reset. Standard testing capacity is 35 pounds, but higher ranges can be provided to order.

For complete details circle number 3 on CF's Information Service card, page 57.

'Filtairette' Package

Long a proven product in the field of protection against non-toxic dusts and the hazards of sprays, 'Filtairettes,' a product of General Scientific Equipment Company, are now packaging refills in a new self-dispensing container. The container allows the easy, quick removal, one-at-a-time, of the refills, without touching any but the filter being put into use.

Filtairettes combat the problem effectively, with a remarkably efficient, truly comfortable lightweight dust mask, and the replaceable cotton filters costs only two cents each.

Because Filtairette Protective Masks weigh only one-half ounce, and are so pliable they fit the contour of any shape face, there is a maximum of comfort to the wearer. Filtairette Protective Masks can be worn with glasses or goggles, too.

The masks cause no breathing difficulties, in fact they allow more air to get through, while at the same time trapping more than 400 different varieties of non-toxic dusts and eliminating spray hazards.

For further information contained in Bulletin No. 48ANR, circle number 4 on CF's Information Service card, page 57.



Portable Bag Closer

A new model portable bag closer, offering greater capacity and adaptability to a wider range of bag closing applications than previous models, has been introduced by the Dave Fischbein Company, manufacturer of bag closing equipment.

Designed to perform continuously and dependably even under extremely adverse conditions, the new Fischbein Model D stresses simplicity of operation. It can be used efficiently even by totally inexperienced operators to close all types and thicknesses of textile and paper bags. Its greater capacity and increased versatility broadens the entire field of use for portable bag closers.

The Model D Bag Closer can be used as a completely portable unit, or in one position with specially designed Fischbein suspension units. It can be operated with a Fischbein Faseal Taping Attachment for applications where tape bound closers are required.

For further information on the new Model D, circle number 5 on CF's Information Service card, page 57.

Bolted Steel Storage Bins

A new four-page folder with exploded drawings and arrowgrams covers 16 Finco bin features.

For a free copy, circle number 6 on CF's Information Service card, page 57.

Epoxy Laminate Containers

Tarrant Company has announced a new line of epoxy laminates reinforced with fiberglass for maximum tensile strength. Fabricated into containers, the manufacturer states that the material readily withstands the attack of caustic fertilizers, either liquid or dry, and resists attack of most acids (except hydrofluoric).

Two resin systems are available, one designed to operate at temperatures up to 240 F., the other to 400 F., and either of these limits can be increased with proper tempering.

The material has the strength to hold large quantities of materials, yet fabricated vessels remain very light. Containers are made in sections which may be bolted together or laminated so they can be easily dismantled and moved if necessary.

Technical service is available, and the manufacturer invites inquiries from users, or from qualified laminators who may wish to fabricate with the new material.

For detailed information, circle number 7 on CF's Information Service card, page 57.

Trackside Shakeout Bulletin

The new trackside shakeout of Hewitt-Robins is described in a bulletin now available.

Complete pushbutton control makes the shakeout a one-man job. Equipment can be operated automatically from remote control station, preventing accidents. No heavy, suspended equipment needs manhandling into position.

Efficient when up to 8 cars per day need unloading, economical when just one car per week needs unloading.

For unloading of limestone and other bulk materials.

Vibrating head sets automatically against side of car, ready to go in seconds. More than 14 tons of vibrating force are applied. Covered hopper cars can be unloaded efficiently with the new shakeout. Only a simple concrete base is required.

Specifications: 2400#, 7½ HP high torque vibrator drive, 3 HP hydraulic pump motor.

For Bulletin 172, circle number 8 on CF's Information Service card, page 57.



Belt-Propelled Tripper

Finco, Inc. announces a versatile new low cost belt-propelled tripper. The entire unit weighs 762 pounds, completely reversible, spots the conveyed commodity at any point in your material handling system. The tripper can be easily set up for automatic stock piling. Ideal for light weight materials. Accommodates belt sizes from 12 to 24 inches.

Many discharge arrangements available including 3 way spout shown.

When used with Dual Roll Idlers (Rabbit-Ears) capacities for 265 tons per hour (material weighing 100# cu. ft.) can be obtained at 300 ft. per minute belt speed.

For complete details, circle number 9 on CF's Information Service card, page 57.

'Purchasing For Profit'

'Purchasing for Profit' is the newest of the 8 IMC Full Orbit manuals written especially for fertilizer manufacturers, by the Materials Department, Agricultural Chemicals Division, International Minerals & Chemical Corporation.

The subjects in the new manual range from record keeping in the plant to production planning and raw material inventories, from the effects of local zoning laws on plant modifications to business and tax considerations involved in the decision to buy or lease equipment.

Free copies of the manual may be obtained by circling number 10 on CF's Information Service card, page 57.

Let Our Information Service Bureau

get detailed
literature for you
about

- ♦ NEW PRODUCTS
- ♦ NEW MATERIALS
- ♦ NEW PROCESSES
- ♦ NEW SPECIFICATIONS

just fill in the card
... circle the proper number(s)
... and drop it in the mail

TEAR OFF ALONG DOTTED LINE

COMMERCIAL FERTILIZER Information Service Bureau
Please send me additional information on item numbers circled below:

6-61

1	4	7	10	13	16	19	22	25	28	31	34
2	5	8	11	14	17	20	23	26	29	32	35
3	6	9	12	15	18	21	24	27	30	33	36

NAME

POSITION

COMPANY

ADDRESS

CITY ZONE STATE



Pull-Type Applicator

Newton Crouch is offering a new pull-type applicator for liquid fertilizers and other materials. Ruggedly built for heavy-duty commercial application service, the unit offers a 220-gallon calibrated tank in aluminum or stainless steel; a 27½ foot boom with shock absorbers and adjustable height, in aluminum or stainless steel, with a wide choice of nozzles.

The applicator comes in two models, one with rigid frame stationery wheels, the other with wheels adjustable from 32 to 42 inches. It can be equipped either with a Dempster piston metering pump or with a Hypro roller pump for application, or can be furnished with one pump for metering and another pump for agitation.

For additional information on the rugged, versatile Crouch applicator, circle number 11 on CF's Information Service card, page 57.

Standard Belt Conveyors

Standard Belt Conveyors, 9'-99'; 11-page brochure covering detailed specifications and prices for a range of conveyors from 9' to 99' long, 18" to 36" wide, to a maximum capacity of 500 TPH, by Finco, Inc.

Complete with charts on bulk material classifications, belt capacities and speeds, horse power and angles and lengths. Brochure includes plan drawings of 3-10 hp and 15-30 hp terminals.

For a copy of the new brochure, circle number 12 on CF's Information Service card, page 57.

Total Acidity Determination

Two-page data sheet Bulletin T2a from Technicon Controls outlines continuous, automatic method for determination of total acidity.

The method details a means by which, with the addition of a suitable buffer, slight changes in acid concentration will give only slight changes in indicator color, instead of the usual sharp, complete change.

A flow diagram of the continuous, automatic analytical system is included, as well as actual chart recordings.

For a copy of the new bulletin, circle number 13 on CF's Information Service card, page 57.

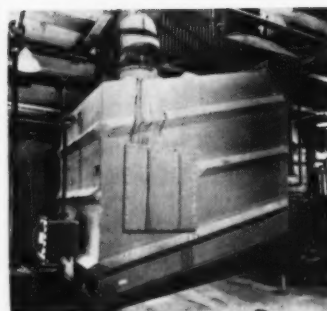
Belt (Stream) Weigher Bulletin

The need of continuous process industries for measurement and control of flow of dry materials at low to medium rates is met by the Model 36-02 Belt (Stream) Weigher, manufactured by B-I-F Industries, makers of feeders and systems for positive control of materials flow. Fertilizer, plastics and chemical plants, sintering plants, food processors, feed and flour mills, weighing fine ore, coke, coal, silica sand and other heavy materials, are typical users of this dependable and durable continuous weighing scale.

Operating in a 10:1 range with Constant Speed Drive or 40:1 with Variable Speed Drive, the Model 36-02 will measure dry material with accuracy ($\pm \frac{1}{2}$ per cent of max. rate) and will continuously integrate weight of material with belt speed. A heavy duty belt, constructed with promel chain edges and driven by sprockets, eliminates slippage and training. The Weigher will measure maximum rates from 10 lbs. per minute to 60 tons per hour, depending on material characteristics. Construction of the Model 36-02 features a pneumatic force-balance load cell that instantly senses and transmits the slightest variation of belt load.

The two-page, two-color bulletin contains illustrations of the Model 36-02, principal dimensions and a description of how the Weigher works. Accessories for remote recording, totalizing, indicating or controlling are also listed.

For your free copy of bulletin Ref. No. 36-02.20-1, circle number 14 on CF's Information Service card, page 57.



Scrubber Made of Plastic

Western Precipitation Division of Joy Manufacturing Company has begun fabricating its Turbulaire-Doyle Scrubber from a molded polyester material for use in fertilizer plant service.

They report that the plastic scrubber is designed to provide maximum flexibility for handling increased capacity in the event it is required sometime in the future, and remains almost maintenance free under the unusually severe corrosive conditions and offers extremely reliable operating characteristics.

For additional information on this plastic scrubber, circle number 15 on CF's Information Service card, page 57.

60-350 Gallon Rubber Tanks

A new portable fabric tank for liquid fertilizer farm, construction and industrial use has been announced by Goodyear Tire & Rubber Company in expanding its line of fabric containers.

The new 'Utility Tanks,' ranging in capacity from 60 to 350 gallons, are offered in eight 'small' sizes and represent an extension of the principle of 'Pillow Tanks,' with capacities as large as 50,000 gallons.

A 350-gallon Utility Tank weighs only 50 pounds when empty and is easily handled by one man. The Utility Tanks are created from finely woven nylon fabric impregnated with a specially compounded rubber, a combination which provides a rugged one-piece unit suitable for both static storage and transportation of liquids. The rubber coating is resistant to liquid fertilizer, fuel oil, gasoline, transformer oil, and weed sprays.

Van Tanks in sizes from 2,750 gallons to 4,500 gallons are designed for use in transportation of liquids of all types in rail cars, trucks and other vehicles that otherwise could not carry liquids.

On the farm, light trucks, flat bed trailers or even sleds can be used to move the smaller sizes, while industrial lift trucks can handle the tanks on skids for in-plant use.

The Utility Tank line is rugged enough to be loaded and unloaded in a sling when full. Each tank is delivered with tie-down straps and fitted with a metal coupling for hose connections.

For complete details, circle number 16 on CF's Information Service card, page 57.

No
Postage Stamp
Necessary
If Mailed in the
United States

Postage
Will be Paid
by
Addressee

BUSINESS REPLY CARD

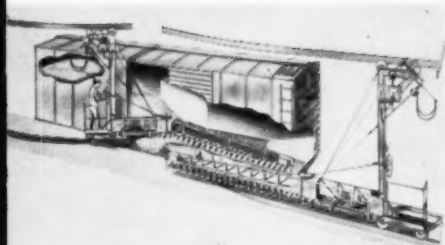
FIRST CLASS PERMIT NO. 678 (SEC. 349 P. L. & R.) ATLANTA, GA.

Information Service Bureau

Commercial Fertilizer and Plant Food Industry

75 Third Street, N. W.

Atlanta 8, Georgia



'Augermobile' Car Unloader

An entirely new method of unloading boxcars has recently been introduced and marketed by Andrews Machine Company.

This unique equipment, the Augermobile, utilizes a moving double screw that pivots on a hinge to reach the blind corners of the car. Because it goes right in to get the material, complex systems for tipping or rocking the car are completely eliminated.

Because of its simplicity, the Augermobile produces high capacity unloading at costs well below other, more complicated systems. In addition, one man is all it takes to operate the entire system, saving substantial labor costs when compared to unloading done by power shovel crews.

Installation requires only a minimum of space and is so simple that it can normally be handled by regular maintenance employees. This same simplicity also reduces the need for highly skilled operators, continual maintenance, or costly repairs.

Complete information on the new Augermobile may be secured by circling number 17 on CF's Information Service card, page 57.

New Testing Sieve Bulletin

Complete technical data on all types of testing sieves including new 1961 ASTM, NBS and ASA sieve standards. Bulletin also gives specification data on the Newark 'End Shak' testing sieve shaker machine. Six pages, 2-colors.

For Bulletin F-S-61 from Newark Wire Cloth Company, circle number 18 on CF's Information Service card, page 57.

Mobile Radio Bulletin

General Electric has published a new bulletin, ECR-793, entitled 'Complete Control with Two-Way Radio.' It describes how mobile communications integrates operations of any business where vehicles are used for sales, service, delivery or supplies.

All of a company's vehicles can be put on a single system or set up on separate networks, depending on the needs of the individual business.

Two-way conversation between vehicles and a central office provides closer coordination and permits business expansion by allowing existing personnel and vehicles to accomplish more.

Bulletin ECR-793 is available by circling number 19 on CF's Information Service card, page 57.

Soil Analysis Instruments

Coleman Instruments, Inc., is offering a descriptive folder which describes their line of instruments for rapid, low-cost soil analysis. The literature briefly describes their Model 21 Flame Photometer with Autoflow (for potassium, calcium, sodium and magnesium), the Model 8 Electric Colorimeter (for phosphorous, magnesium and nitrates), the Model 28 Metrion pH Meter for soil acidity determinations and the Model 29 Nitrogen Analyzer for total nitrogen determination.

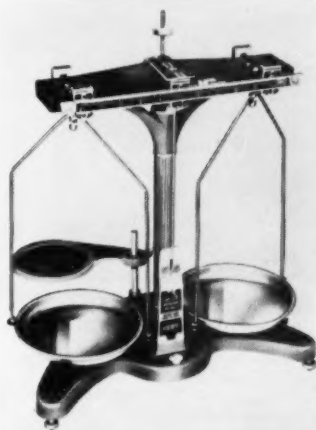
For a copy of Coleman Instruments' Bulletin B-266, circle number 20 on CF's Information Service card, page 57.

Heavy Duty Lab Balance

This overhead beam type balance combines large capacity (2 kg) with high sensitivity (50 mg). It is ideal for many laboratory and educational applications. An adjustable platform with suspension hook will provide for specific gravity determinations. The large stainless steel pans (6" diameter x 3/4" deep) and wide pan bows further increase the utility of this balance.

The balance is supplied with a center of gravity adjustment. This unique feature enables the user to regulate the sensitivity.

The base is especially designed to provide maximum stability and is equipped with spirit level and adjustable leveling feet. The box end beam of cast aluminum guarantees ample strength with high sensitivity.



ity. Knife edges are of case hardened steel. Zero adjustment balance nuts are self-contained so that loss and breakage are eliminated. A relief etched stainless steel beam with center indicating sliding poise provides for readings from 0 to 10 gram x .1 gram divisions.

Beam hangers utilize patented self-aligning bearings which are protected from foreign material by self-locking bearing covers. Beam oscillations can be damped by moving dial plate against the needle to speed readings. List price: \$42.50.

For further details, circle number 21 on CF's Information Service card, page 57.



Automatic Bagging Scale

Richardson Scale Company has announced a new technique of high-performance automatic bagging.

Through an ingenious device which speeds up beam response leading to faster feed cutoff, a new scale (called 'Speedac E-50') weighs up to 24 50-pound bags per minute of free-flowing materials. Even with sluggish materials, such as mashes, meals, and powders, the Speedac E-50 weighs 16 50-pound bags per minute with consistent accuracy. Accuracy capability reaches 2 sigma 1 ounce.

A slide, operated by a handwheel with graduated scale, controls material flow by varying the inlet opening.

For gravity feed, an electrically-controlled pneumatic valve opens and closes a sealed, radial gate. An agitator is added in the inlet chute for sluggish materials, driven by V-belt from an enclosed motor controlled by a beam-operated switch. Power feeders can be either belt, screw, vibrating, or rotary.

The new Speedac E-50 has a wide range of capacities, with standard sizes as follows: 5 lb. to 25 lb., 10 lb. to 50 lb., and 20 lb. to 100 lb. Duplex units provide approximately double these outputs, and Trip-lex models give even higher speeds and/or accuracies.

Many discharge options are available . . . automatic discharge to bag or by manual push button, foot pedal switch, bagholder switch, timber, or impulse from allied equipment. Duplex units incorporate device to alternate the scale discharges.

The new Speedac is capable of fast, accurate weighing of almost all materials which are packaged in open-mouth bags or textile bags, including ammonium phosphate, bentonite, calcium carbonate, cyanimid, diatomaceous earth, fertilizer, fluorspar, fuller's earth, lime, phosphate rock, sewerage products, soda ash, sulphur and tri-sodium phosphate.

The new Speedac E-50 is available in stainless steel for corrosive materials.

For further information, circle number 22 on CF's Information Service card, page 57.

—Supplier News...



Tractor-Mounted Applicator

New Ideal Sprayer Company offers to send information and prices on their Tygart pasture and row crop solutions applicator. The unit is equipped with aluminum tanks in 85-, 115- 170- or 230-gallon capacities, and with steel and rubber hose booms in 21- or 28-foot widths. The applicator features mounting brack-

et with positive displacement metering pump, complete with drops, orifice plates, chain and sprocket.

Booms are front or rear mounted at the same price. Brackets are all steel and will fit all models of row crop tractors.

For additional information on the Tygart applicator, circle number 23 on CF's Information Service card, page 57.

Static Rubber Storage Tanks

United States Rubber Company has issued a revised specification sheet covering its line of static rubber storage tanks in capacities from 500 gallons to 100,000 gallons.

The tanks are recommended especially for temporary storage at

distributing and terminal locations that are seasonal or may need to be moved to another site readily.

The revised specifications cover capacity, empty and filled dimensions, rolled dimensions and dry weight of the flexible, lightweight containers.

For a free copy of the new four-page, two-color specification sheet on static storage units, circle number 24 on CF's Information Service card, page 57.

Quick-Opening Multiwall Closure

A unique quick-opening closure for sewn open-mouth and sewn valve multiwall paper shipping bags has been developed by Bemis Bro. Bag Company and now is available throughout the United States except in certain eastern portions of the country and the West Coast.

The company is presently proceeding with fabrication of the specially designed and built machines for installation in Bemis plants on the East and West Coasts and expects to have the new feature available nation-wide within a few months.

The Bemis-Strip closure, as it is being marketed, is identified by a



red tab at the seam of the bag. Used in actual packing and shipping operations, the closure has proven to be completely effective in withstanding ordinary stretch and breakage and sifting of product at the seam. It offers protection at the bag seam equal to present methods of closing sewn bags.

A time—and labor-saving feature, the Bemis-Strip tab is as simple to open as the band on a package of cigarettes. There is no contamination of product from loose threads and the clean opening permits reuse of the bag.

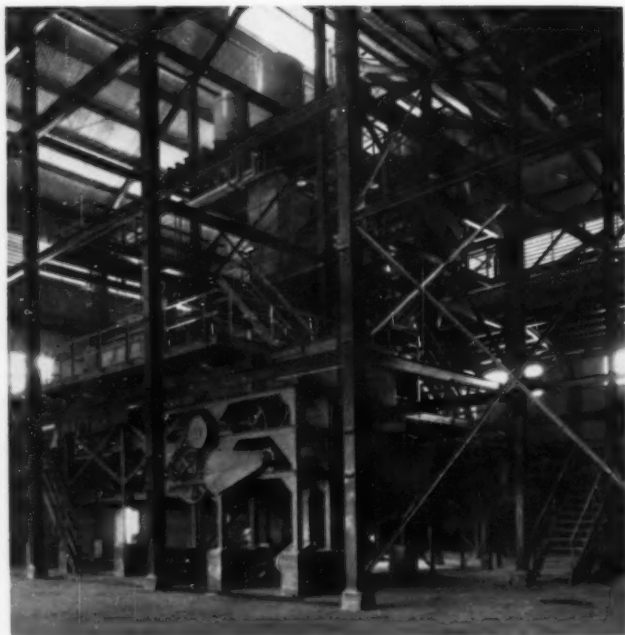
The tab, three inches in length and three-eighths inch in width, is placed on the factory-closed end of the bag, usually at the top. The tab serves as a point of contact for the thumb and first finger to initiate the opening of the package.

A gentle pull snaps the tab loose from the bag seam. A swing of the arm forces the sewing thread and literally pops the bag open, ready for emptying of contents. The bag can be opened partially, to form a filling spout, or completely, as desired.

The Bemis-Strip multiwall bag can be used for fertilizer, feed, seed, flour, grain, salt, ready-mix cements, and chemicals, to mention a few successfully shipped products.

For further information on the Bemis-Strip closure, circle number 25 on CF's Information Service card, page 57.

Quality...by Atlanta Utility



BROADFIELD CONTINUOUS SUPERPHOSPHATE UNITS

- Continuous Production At High Capacity; Units from 5 to 100 Tons Per Hour
- Quality Product, High Conversion, Short Curing Time, Excellent Condition
- Low Labor and Low Maintenance Costs, One Operator
- Durable Long-Lasting Equipment
- Flexibility; Normal, Enriched, or Triple Superphosphate
- Use 77-80% or 93-96% Sulfuric Acids or Phosphoric and Sulfuric Acids
- Installations Throughout The World

CONTINUOUS AMMONIATORS—GRANULATORS—BATCH MIXERS
BREAKERS — PULVERIZERS — CAGE MILLS — BELT CONVEYORS
BAGGED GOODS CONVEYORS — REVOLVING & VIBRATING SCREENS
COMPLETE MIXING UNITS — SHIPPING UNITS
MATERIALS ASSEMBLY HOPPER UNITS — HOPPER SCALES
BROADFIELD CONTINUOUS SUPERPHOSPHATE UNITS

Call or write today for information

ATLANTA UTILITY WORKS

Phone: POplar 1-2104

EAST POINT, GEORGIA

Manufacturers and Engineers for 63 Years

New Liquid Fertilizer Pump

New from Barnes Manufacturing Co is a line of self priming centrifugal agricultural pumps for liquid fertilizer, petroleum and water.

Easy bolt-on feature results from Barnes new pump design . . . since pump is not close coupled, open adapter construction protects engine from solutions. Shaft locking collar acts as slinger, preventing solutions from entering engine. Simply slide pump onto crankshaft, tighten four bolts to engine, tighten pump shaft locking collar and pump is ready for operation. The new unit bolts on to all standard horizontal engines for fast, easy use.

Specially designed to meet liquid fertilizer application requirements, the pump finds use at bulk stations, storage tanks, truck transports, nurse tanks, and field applicators.

Replaceable volute and impeller cut expensive down time and maintenance cost. Acid and abrasive resistant materials include cast iron body, impeller, volute and mounting head, solid stainless steel pump shaft and Buna-N check valve.

The ceramic-stainless shaft seal is application engineered of a special molded material, field proven, solid ceramic face with pure carbon rotating ring for long life in abrasive solutions, stainless steel spring and metal parts resist corrosion in acid-content mixtures. A stainless steel pump shaft locked to engine shaft assures perfect alignment; liquid being pumped can not touch engine shaft.

For a copy of Barnes form 617-1260, giving full specifications and performance characteristics, circle number 26 on CF's Information Service card, page 57.

'Gyro-Ribbon' Mixer

The Machinery and Equipment Division of Superweld Corporation offers a new four-page descriptive folder covering its line of hemispherical 'Gyro-Ribbon' mixers, available in sizes from ½ to 19 cu. ft. capacity. Unusual versatility permits the unit to handle most dry, powdered or granular materials with a mixing process so complete and uniform that even trace elements are blended homogeneously throughout the mixture.

The company manufactures a wide line of equipment for receiving, elevating, mixing, grinding, sifting, conveying and packaging, and their mixers include rotary drum mixers, tumbling mixers, coaxial ribbon mixers (13 to 250 cu. ft.) and wet granulating mixers.

For your copy of the booklet on the Gyro-Ribbon mixer, circle number 27 on CF's Information Service card, page 57.

Gas-Powered Lift Trucks

The flexibility of gas power plus the efficiency of electric drive offered in the GLF series lift trucks is discussed in a new 16-page 'How' booklet published by the Automatic Transportation Company. Now the benefits of electric drive are available in a lift truck.

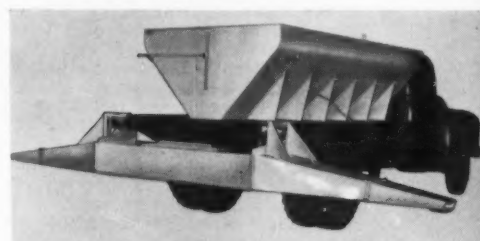
Six pages of breakdown photo-

graphs are used to illustrate many of the GLF's features over conventional clutch drive or torque converter type trucks. Driver comfort and safety is shown and how these factors help boost efficiency.

Five pages of application photographs of both standard GLF trucks and specials with attachments point out how typical loads are handled in a wide variety of industries.

Basic specifications are shown for 13 standard models in the GLF line giving dimensions in an easy to read table.

To obtain a free copy of the 'Facts and Factors Booklet About Gas-Powered Lift Trucks,' circle number 28 on CF's Information Service card, page 57.



Convertible Multi-Purpose Unit

The 'Hawkeye' Convertible, a lime and fertilizer spreader, is also a multipurpose unit adaptable for a flat bed truck, self-unloading grain box or a dump body.

The Hawkeye Convertible spread-

PROFITS GROW BEST WITH LIQUID FERTILIZER



Liquid fertilizers are booming. In the past two years alone, manufacturing plants have doubled and retailers report sales as high as 100 tons of liquid to every ton of dry!

When you sell liquid fertilizers you offer the farmers in your area greater speed, uniformity, and accuracy of application, lower cost of application per acre, and increased flexibility of application.

Nine chances out of ten your customer will look to you for custom application, too . . . adding further profits on almost every sale.

Get your share of this growing business by offering your customers a complete one-stop fertilizer source. We can furnish you with all the equipment you need, help you establish sources of supply, work with you to get your liquid fertilizer business started.

No matter what size operation you plan, Tryco can serve you with a more complete line of equipment and supplies than any other company. You'll find Tryco the ideal one-stop source for every need . . . from storage tanks or nurse tanks to transfer pumps, fiberglass tanks, hose, and nozzles.

Let us show you, too, how economical Tryco applicators and complete line of liquid fertilizer equipment can help you make the most of the profit opportunities right in your own area. A letter or a phone call will bring you complete information . . . without obligation, of course.



TRYCO MANUFACTURING COMPANY, INC.

1160 SOUTH MONROE STREET • DECATUR, ILLINOIS
P.O. BOX 1277 • PHONE 428-4666

er, developed by Iowa Portable Mill Company, has a capacity of 7 tons for fertilizer or 9 tons for lime. The spread pattern is 24 feet with the hoods and 42 feet without the hoods. Body size of the hopper is 144 inches long by 43 3/4 inches high by 78 inches wide.

A 16 1/2 inch center conveyor chain carries the fertilizer to the rear of the truck. Dual spinners, which are easily removed, spread the fertilizer in an even pattern. The feed gate opening is controlled by an accurately graduated gear and track mechanism.

A ruggedly built truck bed will carry any of these bodies. A simple half-ton hoist and overhead support is all that's needed to remove the hopper from the flat bed of the truck. You merely release two turn buckles and lift. This permits an operator to make year 'round use of his truck chassis. He can quickly convert his truck from a lime spreader to a grain box to a flat bed body in a matter of minutes.

For complete information, circle number 29 on CF's Information Service card, page 57.

New Elevator Bucket

A bulletin describing a new malleable iron bucket for economical handling of fertilizer and similar materials is announced by Webster Manufacturing, Inc.

The manufacturer states that in test applications this new design has lasted up to three times as long as conventionally designed buckets. Strength and wearing qualities are

increased through use of extra metal thickness in strategic areas where wear is greatest while, actually, the new design weighs less than the ordinary reinforced-back buckets.

Also, Webster states that the newly designed lip digs more easily into fertilizer, scooping up a fuller load. Reinforcing ribs on the back are so shaped as to permit use with a wide range of chain attachments normally used in fertilizer handling service.

For Bulletin K-496, circle number 30 on CF's Information Service card, page 57.

Automatic Phosphate Determination

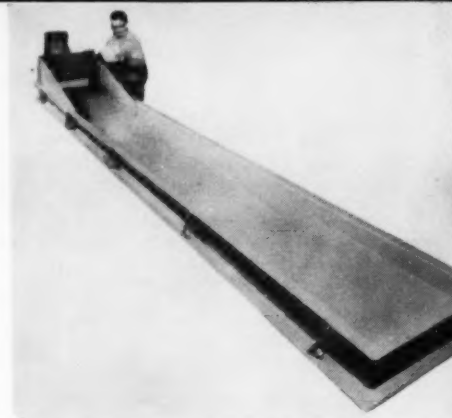
A new two-page data sheet outlines newly-developed procedure for continuous, automatic determination of phosphate content of phosphate rock.

The reaction is based upon the reduction of phosphomolybdate to molybdenum blue by 1-amino-2-naphthol-4-sulfonic acid after the rock has been sample digested. An appropriate method for rock sample digestion is given.

The procedure reviewed was used for a range of 0-25% P₂O₅. Sensitivity increases or decreases may be achieved by a variation in the amount of rock and/or the final dilution of the digested sample prior to analysis.

Technicon Controls' data sheet includes a flow diagram of the system and actual chart recordings.

For your copy, circle number 31 on CF's Information Service card, page 57.



Pneumatic Conveyor Feeder

Their new Model NF-6-168 Pneumatic Conveyor Feeder has just been announced by National Air Vibrator Co.

The new feeder measures 16'8" in length, has a 4" x 24" trough that can move bulk or granular material at capacities of up to 30 tons per hour.

The flow rate can be easily changed by adjusting the air pressure range from 20 to 70 p.s.i.

The new feeder is operated by a Navco BH4 air vibrator that incorporates Navco's patented one-piece design and has the silent type vibrator piston as the only moving part. Since the new feeder uses no bearings or electrical control adapters, the manufacturer claims it is practically maintenance free and requires no expensive stock of spare parts.

For further information, circle number 32 on CF's Information Service card, page 57.

Tyler Leads the Way!

a sensational
BREAK-THROUGH
in design and
engineering!

DO-IT-YOURSELF

fertilizing equipment which you can rent to your customers . . . spreads up to an acre per minute.

- Hauls and spreads fertilizer quickly and efficiently
- 45 foot spread pattern
- Investment in this machine will move up to 600% more fertilizer

TYLER F-2 SPREADER*

*PATENT PENDING

**distributor
and dealer
inquiries
invited!**

also a complete
line of truck
bulk spreaders

SPECIFICATIONS

Body Weight 1500 lbs.
Hopper Dimensions 60" x 84"
Wheel Track 74 inches
Axle Rating 4000# each axle
Type Axle Tandem Torsion Spring
Fans Angled Twin 19 in. Dia.
Wheel Bearing Sealed Timkin Bearing
Capacity 2 1/2 Ton
With Body Extension: 19 in. 4 Ton
Spread Pattern Approx. 45 Ft.
Spread Capacity Pr. Hr. 30-60 Acres
Field Speeds
6 M.P.H. 30 Acres Pr. Hr.
12 M.P.H. 60 Acres Pr. Hr.
18 M.P.H. 90 Acres Pr. Hr.
Highway Speeds up to 60 M.P.H.

Tyler

Phone Viking 2-8581

MANUFACTURING COMPANY

East Highway 12

Benson, Minn.



New Liquid Meter

A new meter with remote read-out, especially designed for handling liquid fertilizers and other corrosive liquids, is described in bulletin SP-RT-1 of the Industrial Products Division of Badger Meter Manufacturing Company.

The 1-inch stainless steel meter uses an oscillating piston as the measuring element so that all liquid can be confined within the measuring chamber. The motion of the piston is transmitted by a magnetic couple to the gear train. This, in turn, drives a pulsing switch which totalizes the quantity of metered liquid on the remote readout, or a remote repeat batch controller.

The two-page bulletin includes specifications, dimensional drawings, and an accuracy graph on the meter.

For your copy, circle number 33 on CF's Information Service card, page 57.

Dry Weigh-Feeder Catalog

Model 37-02 Belt Gravimetric Feeder, which continuously weighs and feeds any dry, flowable material at a fixed rate, is described in B-I-F Industries' new Catalog 37-02.20-1. Ruggedly built, compact, and completely automatic in operation, it feeds a maximum of two cu. ft. per minute over a 100:1 range within an accuracy of $\pm 1\%$ of the set feed rate.

The Model 37-02 is ideally suited for proportional feeding of solids with other solids or liquids. It makes a versatile, useful component in systems designed for the processing of fertilizer materials, chemicals, and minerals. Its rate of feed can be paced by other equipment and can, if desired, control or proportion other components in a system.

Compact construction of the Model 37-02 makes it possible to mount on, over or beside other equipment.

Wide range is infinitely variable in any increment from one to a hundred. Safe construction is assured in the one-piece, all-welded steel housing with large transparent removable doors, large belt guard, and built-in alarm system.

The new, four-page, two-color catalog, just issued, shows illustrations, dimension drawings, installation diagrams and description of operations.

For your free copy of Catalog Ref. No. 37-02.20-1, circle number 34 on CF's Information Service card, page 57.

June, 1961

NOW — a truly
LOW-COST CARRIER
with
deep-troughing
high-capacity
performance



Finco DUAL-ROLL IDLERS

A budget-priced component for low-cost conveying:
Finco DUAL ROLL (rabbit ear) IDLERS are the result of sound engineering, designed by men who know material handling. Never before such superb performance with lightweight material, such deep-troughing, high-capacity at such low-cost. Write for literature on the Finco "rabbit ear" idlers — built to handle 8" to 24" belt widths.

Finco inc. AURORA, ILLINOIS



U.S.A.

Time and Tamms

produce the products you need

Tamms Red Oxide for color...
other Tamms components for quality!

For the rich, vibrant color that can give your fertilizer that distinct difference, count on Tamms for the tint! Use consistent quality Tamms Red Oxide, test proved non-toxic, extraordinarily high in coloring strength. Available in natural or synthetic for quick shipment in multi-wall bags, on LCL truck, or carload basis.

MINERAL BLACK
High grade Black Shale. Contains about 25% coloring carbon.

BENTONITE CLAY
Suspension stabilizer for liquid fertilizers that inhibits growth of soft crystals in suspension.

YELLOW OCHRE
Strong color value for creating tints. Extra easy blending.

DIATOMACEOUS SILICA
Widely used as an anticaking agent for granular fertilizers.

Tamms INDUSTRIES CO. Tamms

228 North La Salle Street • Chicago 1, Illinois

TIME TESTED PRODUCTS FOR INDUSTRY

Association Activities

New Phosphorus Determination Methods Topic of Fertilizer Analysis Workshop

Analytical chemists in industry and government laboratories concerned with the techniques and procedures of analyzing fertilizers and fertilizer materials are invited to attend a workshop July 6-8 at Purdue University co-sponsored by the Association of American Fertilizer Control Officials, the Association of Official Agricultural Chemists and the National Plant Food Institute. The meeting will be held at the Biochemistry Department, Purdue University, Lafayette, Indiana.

The purpose is to familiarize chemists with recent developments in new methods for determining phosphorus in fertilizers. Up for study and review will be two Quinolinium Methods; Spectrophotometric Method; and Official Volumetric Method 2.020.

Tremendous interest among analytical chemists in the U.S.A. and Europe in these methods prompts this workshop. Those who attended the previous workshop on sodium tetraphenyl boron and nitrogen methods know how worthwhile and instructive these studies can be.

Registration fee will not exceed \$5.00. Registration is being handled through Dr. F. W. Quackenbush, State Chemist, Biochemistry Department, Purdue University, Lafayette, Indiana. Should registration be large, the registrar is authorized to limit attendance.

The following hotels and motels are suggested for accommodations. Registrants will make their own reservations: Purdue Memorial Union, Purdue University, Lafayette, Indiana; Van Orman-Fowler Hotel, Lafayette, Indiana; Motels within five miles of Purdue campus: Cedar Creek Motel, Esquire Motel, Howard Johnson Motor Hotel, Morris-Bryant Motel, all at Lafayette, Indiana.

The organizing committee for the workshop consists of: F. W. Quackenbush, W. Hoffman, C. W. Gehrke, E. D. Schall, C. H. Perrin, V. Sauchelli.

Program for Workshop on New Phosphorus Methods for Fertilizers

Thursday, July 6

a.m. Registration

p.m.

- 1:00—Principles of the Quinolinium Method—W. M. Hoffman
- 1:30—Details of the Gravimetric Procedure—Carrol Perrin
- 2:00—Laboratory work (groups of three persons) on entire gravimetric procedure through filtration, drying and desiccation of ppt.
- 5:00—Adjourn

Friday, July 7

a.m.

Prior to 9:00—Weigh crucible, calculate and turn in results.

- 9:00—Discussion period
- 10:00—Laboratory work on volumetric procedure. (quinolinium)
- 12:00—All volumetric results are due.

p.m.

- 1:30—Discussion of results
- 2:00—Principles of the photometric method—Charles Gehrke
- 2:30—Details of the procedure—F. J. Johnson and John Brabson
- 3:00—Laboratory work (groups of three). Prepare standard curves, complete digestions of sample.

Saturday, July 8

a.m.

- 8:30—Discussion of method.
- 9:00—Laboratory work to complete photometric analysis.
- 10:45—All results are due.
- 11:00—Discussion of results.
- 12:00—Adjourn

Georgia PFES Holding 10th Anniversary Meet

Georgia Plant Food Educational Society is holding its tenth anniversary meeting June 6-7 at the state's beach resort, Jekyll Island. The meeting centers around a business session, but allows plenty of time for relaxation and enjoyment of the recreational facilities of the area, and planned activities for families have been included in the convention schedule.

At the business session, four speakers are appearing. J. Fielding Reed of American Potash Institute, Atlanta, is reviewing the history of the Society. Robert Wheeler, director of instruction at the Georgia College of Agriculture, is speaking on Prospects for College Graduates in Agriculture. George H. King, director of Georgia Experiment Stations, is predicting The Future of Agriculture. And Samuel L. Tisdale of the Sulphur Institute, Washington, is discussing the Fertilizer Industry, Past, Present and Future.

Freeman to Speak At Ag Engineers Meet

Members of the American Society of Agricultural Engineers who will gather in Ames, Iowa on June 27 for the Society's 54th summer meeting will hear Secretary of Agriculture Orville Freeman speak on "New Frontiers in Agriculture."

It will be a major Midwestern appearance for the Secretary, according to the Program Committee.

Industry Meeting Calendar

DATE	EVENT	LOCATION	CITY
June 5-7	Southern Fertilizer Control Officials	Lafayette Hotel	Lexington, Ky.
June 11-14	National Plant Food Institute	The Greenbrier	Wh. Sul. Spgs., W. Va.
June 27-29	Pacific N.W. Fertilizer Conference	Marion Hotel	Salem, Oreg.
July 16-17	Plant Food Institute of N.C. & Va.		Asheville, N. C.
July 19-21	Southwest Fertilizer Conference	Galvez Hotel	Galveston, Tex.
Aug. 16-20	Canadian Fertilizer Association	Manoir Richelieu	Murray Bay, Que.
Oct. 4-6	Southeastern Fertilizer Conference	Biltmore Hotel	Atlanta, Ga.
Oct. 12-13	Northeastern Fertilizer Conference	Schine Inn	Chicopee, Mass.
Oct. 16-17	Fertilizer Safety Conference	Pick-Congress Hotel	Chicago, Ill.
Oct. 25-26	Fertilizer Control Officials	Woodner Hotel	Washington, D. C.
Oct. 30-Nov. 1	National Fertilizer Solutions Assn.	Edgewater Beach Hotel	Chicago, Ill.
Oct. 30-Nov. 1	Official Agricultural Chemists	Shoreham Hotel	Washington, D. C.
Nov. 2-3	Pacific N.W. Fertilizer Assn.	Cearhart Hotel	Cearhart, Oreg.
Nov. 8-10	Fertilizer Industry 'Round Table'	Mayflower Hotel	Washington, D. C.
Nov. 12-14	California Fertilizer Association	Jack Tar Hotel	San Francisco



Only Burlap can hold 200 lbs. safely!

Want *important* savings? Use burlap. You save on space, because burlap bags stack higher. You save on waste...burlap keeps breakage down. You save on handling costs...only burlap can take on 200 pound loads. You save on the bags themselves...burlap is re-usable. And another big plus...the farmer likes burlap. *He* asks for it. You should too.

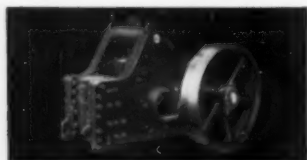
THE BURLAP COUNCIL • 122 East 42nd Street, New York 17

NO MAJOR REPAIRS IN 25 YEARS*

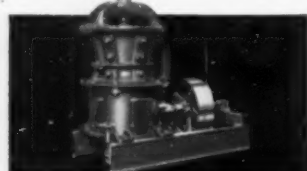
Sturtevant Construction Assures Long Mill Life at Top Loads

Sturtevant crushing and grinding machinery answers the long life top-load production problem for medium to small size plants. Many Sturtevants have been operating above rated capacities for more than 25 years, and without a major repair.

"Open-Door" design gives instant accessibility where needed — makes cleanouts, inspection and maintenance fast and easy. Machines may be set up in units to operate at equal quality and capacity.



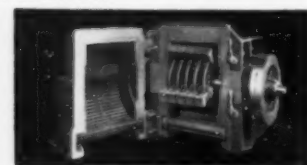
Jaw Crushers — Produce coarse (5 in. largest model) to fine (1/4 in. smallest model). Eight models range from 2 x 6 in. jaw opening (lab model) to 12 x 26 in. Capacities to 30 tph. All except two smallest sizes operate on double cam principle — crush double per energy unit. Request Bulletin No. 062.



Rotary Fine Crusher — Reduce soft to medium hard 1 to 8 in. material down to 1/4 to 1 1/4 in. sizes. Capacities up to 30 tph. Smallest model has 6 x 18 in. hopper opening; largest, 10 x 30 in. Non-clogging operation. Single handwheel regulates size. Request Bulletin No. 063.



Crushing Rolls — Reduce soft to hard 2 in. and smaller materials to from 12 to 20 mesh with minimum fines. Eight sizes, with rolls from 8 x 5 in. to 38 x 20 in.; rates to 87 tph. Three types — Balanced Rolls; Plain Balanced Rolls; Laboratory Rolls — all may be adjusted in operation. Request Bulletin No. 065.



Hammer Mills — Reduce to 20 mesh. Swing-Sledge Mills crush or shred medium hard material up to 70 tph. Hinged-Hammer Pulverizers crush or shred softer material at rates up to 30 tph. Four Swing-Sledge Mills with feed openings from 6 x 5 in. to 20 x 30 1/2 in. Four Hinged-Hammer Pulverizers with feed openings from 12 x 12 in. to 12 1/2 x 24 in. Request Bulletin No. 084.

*Reports Manager W. Carleton Merrill concerning Sturtevant Swing-Sledge Mill at James F. Morse Co., Boston.

STURTEVANT MILL COMPANY

153 Clayton St., Boston 22, Mass.

—Around the Map...

(Continued from page 32)

mission originally extended the schedule to 1960 at the request of the French contractor, who has now asked an additional extension to October 28 for bringing the unit onstream.

PORTUGAL

Uniao Fabril do Azotoa, Lisbon, has awarded the M. W. Kellogg subsidiaries contracts for engineering of the ammonia and urea plants; C&I Girdler International will handle the nitric acid, ammonium nitrate and nitro limestone units planning.

RHODESIA

The Ministry of Commerce and Industry has invited a dozen international concerns to make proposals, due in September, for their proposed \$22,400,000 N fertilizer and explosives plants.

UGANDA

Uganda Development Corp. have contracted with Simon Engineering's Simon-Carves to supply a sulphuric acid plant and a single superphosphate plant as part of the fertilizer factory being built at Sukulu, near Tororo.

The superphosphate plant will produce 25,000 tons a year of granulated single superphosphate made from locally mined apatite rock and the output will be sold in East Africa, mainly in Kenya.

The new U.D.C. facility, to be called Tororo Industrial Chemicals and Fertilisers Ltd., will produce its own sulfuric acid for the superphosphate it manufactures. Sulfur for the acid unit will be imported at the rate of 3000 tons annually, and there will be about 1500 annual tons of surplus acid after the superphosphate plant requirements are met.

A six-year management contract has been let to African Explosives & Chemical Industries, under which this firm will also handle sales of the superphosphate and surplus sulfuric acid produced at Sukulu.

VIETNAM

South Vietnam is seeking West German credit for a plant near the Nong-Son coal mines—to be a 60,000 annual ton urea producer, with other plants to follow.

8 REASONS A Marietta SILO SYSTEM CUTS BULK STORAGE COSTS...

1

Built for safer, better bulk materials protection.

2

Engineered to operate with any materials handling system.

3

Designed to meet precise requirements.

4

Space saver that consolidates materials, minimizes space needs.

5

12 types of gravity discharge systems to meet any need.

6



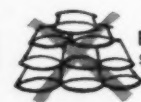
Eliminates ground storage losses.

7



Cuts handling costs.

8



Eliminates expensive bagging.

For complete information on how a Marietta Industrial Silo System can be engineered to meet your exact requirements and help you to cut costs, speed handling and protect materials, write for our Industrial Storage Systems Catalog.



CONCRETE DIVISION

AMERICAN-MARIETTA COMPANY
Marietta, Ohio

Representatives in principal cities

Phillips Begins Service with Refrigerated Ammonia Barges

Phillips Petroleum Company has recently taken delivery on two barges, the *Mary Lee* and the *Marjorie B.*, for the transportation of anhydrous ammonia and LP-Gas in a fully refrigerated condition. These are believed to be the first large volume refrigerated barges ever constructed.

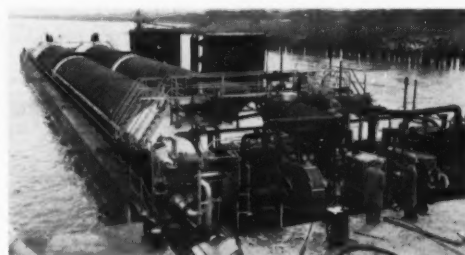
The barges will begin operation as an integrated tow to transport anhydrous ammonia from Adams Terminal, on the Houston ship channel, to East St. Louis, Illinois. They will be loaded with ammonia from four 1000 ton spheres operating at about 40 psig (plus 26° F.). The cargo will be cooled to atmospheric pressure (minus 28° F.), while in transit, by a direct refrigeration system. At East St. Louis, the barges will be unloaded into two 15,000 ton cone roof storage tanks which are designed to operate at atmospheric pressure (minus 28° F.). The size of the tow can be increased in the future by adding a box type barge between the present barges.

The barges are of the open hopper type construction with two horizontal cylindrical cargo tanks in each barge. The capacity of each barge is approximately 1830 tons of ammonia. The lead barge measures 305' x 44' x 12' 6". The trail barge measures 284' x 44' x 12' 6".

The tanks are approximately 16 feet in diameter and approximately 242 feet in over-all length. They were constructed of a special carbon steel having ductility at the low operating temperature. The welds were required to pass the same low temperature ductility tests as the parent metal. The tanks will operate at a maximum of 40 psig. It was necessary to design the tanks for 65 psig pressure to meet the U. S. Coast Guard requirement of a design pressure of 25 psi above the maximum operating pressure.

The direct refrigeration system on each barge operates by drawing vapors from the top of the cargo tanks, compressing and condensing

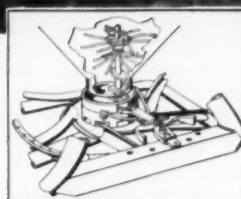
the vapors and returning the liquid to the cargo tanks. Sufficient refrigeration is installed on each barge to handle the heat gained through the insulation, as well as to reduce the cargo temperature from a plus 26° F. to a minus 28° F. in six days. The cargo can then be unloaded directly into the receiving storage without further cooling. The refrigeration capacity on each barge is in two equal size units, either of which is more than enough to maintain the cargo below the tank operating pressure, thus meeting the Coast Guard requirement for standby refrigeration equipment. Failure of both compressors would cause no alarm, as it would take over three



Phillips Petroleum Company's new refrigerated barge unloads anhydrous ammonia fertilizer at the company's East St. Louis, Ill., terminal after completing its first trip from the company's Adams Terminal plant near Houston, Tex. This barge and another one like it are the first large-volume vessels suitable for carrying agricultural ammonia in a refrigerated condition.

weeks for the cargo to warm up from the loading temperature sufficiently to pop the relief valves. After the cargo has been cooled to a minus 28° F. (atmospheric pressure) it would take over two months for the cargo to warm up sufficiently to pop the relief valves.

THE LELY PRECISION FERTILIZER DISTRIBUTOR



EXCLUSIVE LELY FORCE-FEEDING SYSTEM

Featuring: Dynamic design ejector disc/ Accurate, wide range feed control/ Positive agitator for wet or lumpy materials/ Swinging arm adjusts broadcast pattern from rear to side delivery, gives effective wind control.

Simple in design yet robust in construction, the LELY Distributor's exclusive design features assure accurate and uniform spreading of all types of material—fertilizer, lime, seeds, pelletized 24D etc. Spreading range is fully adjustable, from 5 lbs. to 1500 lbs. per acre, with an effective spreading width up to 50 ft. (Does 25 acres an hour). Now available in 3 models—3-point hitch P.T.O. driven (illustrated), Tow type ground driven and Tow type P.T.O. driven. Hopper capacity 1000 lbs.

WRITE FOR FULL DETAILS

LELY LTD., Agricultural Machinery,

P.O. Box 235, Burlington, Ontario, Canada
U.S. Branch & Warehouse — Dover, Delaware



6109

A NATURAL
QUALITY
PRODUCT

USE WITH CONFIDENCE

TAKO

AIRFLOATED
BAGGED OR BULK

GUARANTEED LESS 1% FREE MOISTURE

THE THOMAS ALABAMA KAOLIN COMPANY

QUALITY AND SERVICE SINCE 1939

COSTS SO LITTLE — DOES SO MUCH

2412 KEN OAK ROAD

BALTIMORE 9, MARYLAND

USE "TAKO" Airfloated Colloidal Kaolin, Insecticide Grade. A natural pure inert colloid, exceptional qualities, excels as a diluent-carrier. Its colloidal properties, approx. 35% amorphous material, give increased toxic action, greater adhesive-adsorptive properties. Large tonnage used year after year.

Ortho Division contest sets district against district to

Break the Yield Barrier

The slogan, "Beaten Paths For Beaten Men," certainly does not apply to the agronomists with the Ortho Division of California Chemical Company. On the contrary, imagination and initiative are the two words descriptive of these men who are not satisfied with normal, day-to-day progress. The results from their widely known Break-the-Yield Barrier Contest demonstrates that a combination of imagination and action can do great things in achieving spectacular re-

sults.

The Ortho Break-the-Yield Barrier Contest was initiated by Ortho's chief agronomist, Dr. Malcolm H. McVickar, just two years ago. The rules were simple. Really, there were no rules, except that the measured yields must come from at least one acre. Varieties, planting techniques, culture and fertilization practices were all left to the imagination of the individual field agronomists. The field agronomists actually served as captains of the

district teams. The Break-the-Yield Barrier Contest is a contest between marketing districts.

Yield goals were established for two series of crops having wide adaptation. The crops were classified as "A" crops and "B" crops. In the "A" group, both yield and quality were considered; yield only was considered in the "B" group.

Yield goals and methods used in scoring results are shown below:

GROUP "A" CROP

Yield (25 points)

Use of Agronomic Principles in Developing Fertilizer & Cultural Program (10 points).

New Technical Knowledge Gained (5 points).

Clearness of Presentation (5 points)
Supporting Material, such as photos, slides, etc. (5 points).

GROUP "B" CROP

Yield (25 points)

Use of Agronomic Principles in Developing Fertilizer & Cultural Program (10 points).

New Technical Knowledge Gained (5 points).

Clearness of Presentation (5 points)
Supporting Material, such as photos, slides, etc. (5 points).

Yield is scored on a percentage basis. For example, if the yield of alfalfa runs 8 tons, the score would be 8/12 (75 percent) of 25 points, or 18.75 points. Additional points are given when basic quality is exceeded; points substituted when quality falls below established level.

So much for the goals, but what about the results? Did any of the yield barriers fall? The answer is yes. In the Salinas Valley of California, near Soledad, Ortho's district agronomist, Dr. Richard Kirsch, and Ortho's field representative, Jack Baldwin, working closely with M. A. Clark, produced 12.3 tons of quality alfalfa hay on a two-year

GROUP "A" CROPS

Crop	Yield Barrier	Quality
Alfalfa	12 tons/acre	± 1 point over or under 18% protein
Corn Silage	55 tons/acre (Standardized at 30% dry matter)	± 1 point over or under 10% protein
Sugar Beets	50 tons/acre	± 1 point over or under 16% sugar
Wheat	150 bu./acre	± 1 point over or under 60#/bu. test wt.
Corn	325 bu./acre (at 15% moisture)	± 1 point over or under 9% protein.
Barley	10,000 lbs./acre	± 1 point over or under 48#/bu. test wt.

GROUP "B" CROPS

Crop	Yield Barrier	Quality
Cotton	6½ bales/acre	
Tomatoes	60 tons/acre	
Soybeans	80 bu./acre	
Potatoes	700-100 lb. sacks	Not considered in yield score
Grain Sorghum	14,000 lbs./acre	
Peaches	40 tons/acre	
Safflower	2.5 tons/acre	
Grapes	25 tons/acre	
Pears	40 tons/acre	



Left: Some wheat crop! Actual yield 92.8 bu. per acre. Left to right: Dr. Malcolm H. McVicker, chief agronomist, California Chemical Company; Harold Maus, Ortho representative; Dr. R. E. Warnock, district agronomist, Calchemical. The location is Hamilton, Montana. Grower: Pete Leonard.

Center: Ortho agronomist Dr. R. K. Kirsch examines fifth cutting of

alfalfa at the Pariso Hereford Ranch, Soledad, California. The yield barrier fell on the sixth cutting—12.3 tons per acre. Growers: A. H. Clark and son, Martin Clark.

Right: Grower Vic Hoersch in Quincy, Washington, is pleased with his Break-the-Yield-Barrier field corn crop—251 bushels per acre.

old alfalfa field. The fertilizer treatment on a portion of the field turning out this remarkable yield consisted of 800 pounds 20-20-0 per acre, applied by spreader truck on May 20. On August 3, after the fourth cutting, an additional 350 pounds of 14-14-14 per acre were broadcast on the field.

A total of six cuttings were made, giving a total seasonal yield of 12.3 tons per acre. The remainder of the field, given rather heavy fertilization of only phosphate, turned out 9.7 tons in six cuttings—an excellent yield, but far below the Break-the-Yield Barrier yield of 12.3 tons. In addition, the protein on the Break-the-Yield Barrier field was approximately 2 percent higher than on the adjacent alfalfa. Fertilizers 20-20-0 and 14-14-14 are high in nitrogen and yet they were used on a legume crop. Does this make sense? Well, perhaps we need to change our thinking about nitrogen on alfalfa. Certainly, this yield of 12.3 tons per acre cannot be discounted. At least it points out the need to check out complete fertilizers on legumes.

Up Stockton way, Bud Carmean, a young farmer with an inquiring type of mind, teamed up with the Ortho folks to see what would happen if he grew two crops of barley in one year on the same land. You guessed it! He succeeded. The first crop, planted in November, turned out 2¾ tons harvested on June 10. The field was disced on June 15, then fertilized in one operation. The fertilization treatment for the second crop consisted of a combination of 8-24-0 and ammonia. The seed was drilled in on June 25 at 120 pounds per acre. The field was divided into three areas and each planted to a different variety. The

varieties were Rojo, California Mariout and Aribat. The planting of the different varieties was fortunate. Right from the beginning, the Rojo grew poorly; the Aribat fair; while the California Mariout "went to town."

The field was flood irrigated three times during the season. The summer was of the hottest on record. Even so, the California Mariout variety stooled out very heavily and came into head, somewhat shorter than the first crop, but with nice, plump kernels. The Rojo and Aribat grew poorly, so were destroyed.

Everyone waited for the harvest. On October 8, the second crop was combined and turned out one ton of grain per acre. Everyone had hoped for a little higher yield, but still the experiment was recorded as successful. Carmean has this to say: *Three and ¼ tons of grain per acre per year isn't too bad. You can grow lots of units of the same crop on the same land and this cuts specialized machinery costs to the minimum.*

Carmean and the Ortho men working with him feel they learned a lot of things that will improve yields during the coming year.

Although only the alfalfa yield goal was broken, results from many crops were outstanding. One field of tomatoes in the Santa Clara Valley of California turned out 52.4 tons of exceptionally high quality fruit. In the Intermountain area, a Break-the-Yield Barrier sugar beet field produced 41.8 tons of beets carrying 15.3% sucrose. In the Columbia Basin in Washington, a Break-the-Yield Barrier field of potatoes turned out 32 tons of potatoes, grading out 28 tons of No. 1's.

Speaking of the Columbia Basin,

Ortho's Dr. Lowell Nelson figured the only reason we grow corn in 40-inch rows is because this is the width of a horse's belly, and that we still use this row width, even though horses have long since disappeared from the farm scene. Working with Dick Hoersch, Dr. Nelson planted corn in 22-inch rows, using the population of 34,500 plants per acre. The fertilizer program, on an acre basis, consisted of 500 pounds 14-14-14 plus 500 pounds 20-10-0 plus 500 pounds of ammonium sulphate; a total of 317 pounds of nitrogen, 162 pounds of phosphate and 112 pounds of potash. Again, everyone waited for the harvest. When the weights were tallied up, the yield was a whopping 251 bushels per acre. The rest of the field turned out 138 bushels per acre, a remarkable yield, but far, far below the 251 bushels from the Break-the-Yield Barrier plot.

In another area in the Western states, the Ortho Break-the-Yield Barrier teams grew 4.9 bales of cotton per acre.

One yield barrier broken—several to go. The Ortho boys are "upping" their sights and are now shooting for 15 tons of alfalfa and raring to put into practice the things they have learned during the past year, with a determination to knock over yield barriers of the other crops.

Their slogan—"Beaten Paths Are For Beaten Men—And Ortho Agronomists Are Not Beaten." They are looking beyond the present horizon and know that they can shorten time by using imagination and employing practices whether or not they appear unorthodox in terms of present farming methods.

History is being written. Results will speak for themselves.

CF Staff-Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control Officials and Tabulated by COMMERCIAL FERTILIZER Staff

STATE	April		March		Jan.-Mar. Quarter		July-December		January-June		YEAR (July-June)	
	1961	1960	1961	1960	1961	1960	1960	1959	1960	1959	1959-60	1958-59
Alabama	274,662	350,718	194,668	182,742	264,658	258,322	181,587	180,959	869,240	846,309	1,050,199	1,045,560
Arkansas	105,999	126,184	60,709	68,004	94,138	99,521	61,634	58,714	303,835	289,363	362,548	353,130
Georgia	498,625	306,864	72,263	83,047	222,787	154,797	313,241	299,194	1,102,220	1,130,998	1,401,414	1,425,749
Kentucky	-----	144,047*	53,379	38,102	170,455	137,512	102,192	108,734	461,786	483,820	570,520	591,380
Louisiana	73,812	76,347	44,538	47,969	73,164	73,649	73,814	66,744	224,087	201,642	290,821	265,794
Mississippi	193,506*	-----	118,348*	-----	177,150	170,706	145,632	144,374	547,221	516,917	689,797	693,288
Missouri	-----	196,241*	67,010	36,618	149,929	81,573	334,657	277,708	524,336	563,055	802,044	933,090
N. Carolina	-----	571,328*	324,097	226,532	500,145	393,130	202,694	175,533	1,381,263	1,468,704	1,556,796	1,696,759
Oklahoma	18,661	24,349	21,450	11,463	36,433	19,520	94,690	72,511	72,246	64,738	144,757	133,586
S. Carolina	123,024	262,096	284,236	179,261	387,839	267,247	110,096	104,903	678,986	756,100	783,889	890,302
Tennessee	126,139	193,816	87,857	62,901	188,449	126,524	124,747	117,275	480,429	443,602	607,727	570,718
Texas	129,891	108,583	141,604	114,332	222,801	276,802	234,376	233,410	474,627	441,851	708,037	664,651
California	(reports compiled quarterly)				-----	462,857*	462,347	465,495	813,116	803,261	1,278,611	1,262,996
Virginia	(reports compiled quarterly)				258,171	221,611	168,479	141,177	591,113	618,965	732,290	779,143
Indiana	(reports compiled semi-annually)						317,372	321,956	828,164	856,316	1,150,120	1,172,657
New Hampshire	(reports compiled semi-annually)						-----	3,694*	14,488	16,143	18,182	20,889
TOTAL	1,350,813	1,448,957	1,351,811	1,050,971	2,746,119	2,280,914	2,927,558	2,768,687	9,367,157	9,513,181	12,147,752	12,499,692
(not yet reported) * Omitted from column total to allow comparison with same period of current year.												

NITROGEN

P.O.

K.O.

COMPOUNDS

CRC

FAR EAST

KOREA

TAIWAN

VIET-NAM

IMPORTERS — EXPORTERS

MANUFACTURERS' REPRESENTATIVES

WORLD WIDE FERTILIZER OCEAN SHIPPING & MARKETING

WE PROMOTE INCREASING SOIL PRODUCTIVITY

WITH MODERN FERTILIZERS

IN AREAS OF EXPANDING POPULATIONS

CENTRAL RESOURCES CORPORATION

CABLES
CHEMETOR NEW YORK

120 WALL STREET
NEW YORK 5, N.Y. U.S.A.

TELEPHONE
WHITEHALL 3-4255

Potash Deliveries Up 10% In 1961's First Quarter

Deliveries of potash for agricultural purposes in the United States, Canada, Cuba, and Puerto Rico by the eight principal American producers and also the importers totaled 1,115,911 tons of salts containing an equivalent of 647,764 tons K₂O during the first three months of 1961, according to the American Potash Institute.

Excluding imports, this was an increase of 10% in salts and K₂O over the same period in 1960. Continental United States took 607,799 tons K₂O; Canada, 25,236 tons; Cuba, no tons; Puerto Rico, 10,108 tons; and Hawaii, 4,621 tons K₂O. Exports to other countries were 97,915 tons K₂O, a decrease of 19%.

Deliveries of potash for non-agricultural purposes for the first quarter amounted to 37,423 tons K₂O, a decrease of less than 1% under last year.

Total deliveries for all purposes were 1,339,801 tons of salts containing an equivalent of 783,102 tons K₂O. Excluding imports, this was an increase of over 4% in salts and K₂O over the first quarter of 1960.

INVENTS APPLICATOR

(continued from page 52)

ing long hot dry spells can be adapted to watering the greens, as its pointed slender tines enter the ground clean and do not tear up the turf.

Its recent demonstration on golf links caused one country club ground maintenance man to state that it was the biggest boon to golf greens since sunshine was invented.

Most of the working parts are stainless steel. The drum that holds the fertilizer is of steel, bored out, and chrome plated to avoid corrosion.

Manufacturing and marketing plans have not yet been completed. State and regional franchises for distribution of the Soil Treating Machine are now under consideration.

OHIO TURFGRASS COUNCIL

(continued from page 26)

Research men from the Ohio Agricultural Experiment Station and specialists of the Ohio Extension Service will serve on the Council in an advisory capacity.

Dr. R. R. Davis, Experiment Station agronomist, said the Council's major objectives include collecting and publishing information on turfgrass production in Ohio and encouraging publication of needed information by educational and research institutions.

The Council will also support research and instruction programs at Ohio State University and the Experiment Station by grants of funds which it hopes to collect for these purposes, according to Dr. Davis.

Fertilizer Industry Round Table Proceedings

Complete proceedings of the Fertilizer Industry Round Table technical conference, held last November, are now available.

Price: \$4 per copy. Order from:

Dr. H. L. Marshall, Sec.-Treas.
1604 Walterswood Rd.
Baltimore 12, Md.

IMPORTANT NEWS for Conveyor Scale Users...

CompuDyne Corporation

announces the acquisition of

TRANS-WEIGH COMPANY

and

AUTOMATIC MEASUREMENTS CO.

to broaden the facilities of
its subsidiary

Weighing & Controls, Inc.

Sales and manufacturing will be consolidated under Weighing & Controls, Inc. Trans-Weigh Co. and Automatic Measurements Co. have specialized in the development of electronic weighing systems. Weighing & Controls, Inc. have developed pneumatic weighing systems. The consolidation of these companies gives industry the most advanced engineering thinking and the highest production efficiency available, for automatic weighing control and data processing. Any system from the simplest to the most complex will benefit from this new, consolidated source.

Whether your problem is in Conveyor Scale, Batch Weighing, Constant Feed Weighing, or Check Weighing ... in heavy or light industry ... call W & C.

WC102



CONVEYOR
SCALE SYSTEM



CONSTANT FEED
WEIGH-HOPPER SYSTEMS



CHECK WEIGHING
SYSTEMS



CONTROL PANELS



Weighing & Controls, Inc.

Subsidiary of **CompuDyne Corporation**

Industrial Park, E. County Line Road, Hatboro 10, Pa.

What is Fertilizer?

Fertilizer is power...

That's what Virginia-Carolina Chemical Corp. calls it in the April issue of V-C News, the company's well-edited employee publication. We quote their statement below, because it is so simply worded, yet so complete.

Since you may want to tear this out and keep it, we have reproduced it in larger-than-usual type—

V-C people make and sell fertilizer . . . V-C Harvest King Fertilizer. This fertilizer is power . . . power to produce, power to make people prosperous, power to make a nation great.

It doesn't look very powerful in a bag, in a truck, or when it's being made in a busy plant. In fact, it looks pretty ordinary.

But take it out of the plant; take it out of the truck; take it out of the bag—and put it in the soil. Then watch what happens!

The nitrogen in it makes plants grow fast and gives them a dark green color.

The phosphorus in it gives plants a fast and vigorous start; makes them mature faster.

The potassium in it gives plants vigor and ability to resist disease; stiffens the stalks and stems.

There's calcium that makes roots form early and grow vigorously . . . There's magnesium that plants need to make sugar . . . There's sulfur that stimulates seed production. These are the secondary elements—and just some of the important jobs they do.

In addition, there's still another "power generator": VITEL. This is a combination of minor elements: boron, copper, iron, manganese, molybdenum, and zinc. These are needed in small quantities, but without them, plant growth is retarded.

These "power generators" in fertilizer have created abundant harvests on America's farms. But they have done more than that.

Without the power of fertilizer, Americans would have to work three times as long to earn a loaf of bread; and pay \$13 billion more a year for food.

Without the power of fertilizer, it could cost farmers billions of dollars more to produce as much as they do today.

Without the power of fertilizer, millions of acres that are now used for houses, highways, schools and parks would—now or in the future—have to be used to raise crops.

Because V-C people and others provide this power—and farmers use it wisely—America is strong, and healthy, and happy.

Potash-Sugarcane Research

Another milestone in explaining the functions of potash in plant life has been reached in sugarcane tests by the Hawaiian Sugar Planters' Association Experiment Station, San Jose, Calif.

According to the Association's 1960 Annual Report, nutritional deficiencies can affect both photosynthesis and translocation of sugars in sugarcane plants. Tests by scientists in the Department of Physiology and Biochemistry turned up the following results:

1—Photosynthesis

As nitrogen, phosphate, and potash deficiencies increase in severity, photosynthesis rates decrease.

For example, the photosynthetic activity of a leaf showing no visible signs of potash hunger, but having a K percentage of 0.91, declined 10% more than control leaves containing 1.70 to 1.89 K percentages.

The photosynthesis of leaves showing typical potash hunger with a K percentage of less than 0.40 declined 84 to 98% more than control leaves containing 1.70 to 1.73 K percentages.

These results were obtained from tests with radiocarbon (C14) tagging with photosynthesis chambers clamped across the middle of attached leaves.

2—Translocation of Sugars

Newly formed sugars, the studies showed, move downward at the rate of approximately 2.5 cm. per minute in leaves of well-fertilized plants. But this rate of translocation was reduced in plants suffering from a nutritional deficiency, 33 experiments showed.

Phosphate deficiency did not materially reduce translocation rate.

Nitrogen deficiency showed an intermediate effect.

Potassium deficiency reduced the linear rate of translocation to well below half that of the control.

SHUEY & COMPANY, INC.

Specialty: Analysis of Fertilizer Materials and Phosphate Rock. Official Weigher and Sampler for the National Cottonseed Products Association at Savannah; also Official Chemist for National Cottonseed Products Association.

115 E. Bay Street, Savannah, Ga.

Wiley & Company, Inc.

Analytical and Consulting Chemists

Calvert & Read Streets

BALTIMORE 2, MD.

A NATURAL
QUALITY PRODUCT

SHIPPING POINT
PLANTS
HACKLEBURG, ALABAMA

USE "TAKO" Airfloated Colloidal Kaolinitic Kaolin, Fertilizer Grade, excels as a coater-conditioner of granulated or prilled high analysis and mixed fertilizers. Large tonnage used year after year. COSTS SO LITTLE — DOES SO MUCH.

THE THOMAS ALABAMA KAOLIN COMPANY

2412 KEN OAK ROAD

BALTIMORE 9, MARYLAND

USE WITH CONFIDENCE

TAKO

QUALITY AND SERVICE SINCE 1939

AIRFLOATED
BAGGED OR BULK

GUARANTEED
LESS 1% FREE MOISTURE

classified advertising

RATES: 50 cents a line for **Situations Wanted** ads; \$1.00 a line for **Help Wanted** ads; \$2.00 a line for all other classified advertising. Word count runs approximately eight words per line. Copy should be received by 15th of month preceding publication. **Display Classified Advertising** \$15.00 an inch; minimum space one inch.

HELP WANTED

LARGE CHEMICAL COMPANY supplying plant foods, pesticides and feed additives needs salesmen with 3-8 years selling experience in one or more of these areas. B.S. degree in agriculture, chemistry or chemical engineering preferred. Send resume to W. R. Hayes, Monsanto Chemical Co., Agricultural Chemicals Division, St. Louis 66, Mo.

SITUATIONS WANTED

POSITION WANTED: Chemical Engineer with long record in the fertilizer and related industries. Engineering, management, and production experience in potash, phosphoric acid, ammonia, nitrogen compounds, and mixed fertilizers. Desire responsible technical, production, or management position. Top references. Box 18, % Commercial Fertilizer, 75 - 3rd St., N. W., Atlanta 8, Ga.

PLANT SUPT. Presently employed. Wish to make change for various reasons. Over 20 years experience in mixed fertilizer including 18 months granulation. Have managed both union and non-union labor. Married, 2 children, age 45. For reference and business resume, write box # 17, % Commercial Fertilizer, 75 - 3rd St., N. W. Atlanta 8, Ga. Available July or August.

POSITION WANTED—36-year-old industrial agronomist with 12 years experience in all phases of the fertilizer industry including creating and managing grant-in-aid and fertilizer market evaluation programs desires position in agricultural chemical field, sales management or agronomic development work. Resume upon request. Box No. 22, % Commercial Fertilizer, 75 Third Street, N.W., Atlanta 8, Georgia.

NITRIC ACID PLANT FOR SALE OR LEASE

NORTH LITTLE ROCK, ARK.

Nitric Acid Synthesis plant - 90 ton per day design capacity, 135 ton per day peak capacity. (3) identical lines with compressors, boilers, burner-preheaters, Stainless Steel tanks, condensers, absorbers, pipe, all controls, etc. Designed by Chemical Constructors. Excellent condition. Separate concentrating plant available.

**800 ACRE COMPLETELY DEVELOPED SITE WITH
ALL UTILITIES!
NORTH LITTLE ROCK, ARKANSAS**

PERRY EQUIPMENT CORPORATION
1428 N. 6th St., Phila. 22, Pa.
POplar 3-3505

LAW & COMPANY

Founded 1903
FERTILIZER CHEMISTS

Three Convenient Laboratories
P. O. Box 1558 P. O. Box 789 P. O. Box 629
Atlanta 1, Ga. Montgomery, Ala. Wilmington, N. C.

FOR SALE

- 150 — Worthington 2" x 1 1/2" Worthite pumps.
- 60 — 1350 gal. T347SS tanks, ASME 60 psi.
- 3 — 3000 gal. T347SS tanks, ASME 60 psi.
- 2 — 2600 gal. T316 Stainless pressure tanks.
- 3 — Komarek horiz. dbl. shaft paddle mixers.
- 1 — Robinson 36" dbl. runner attrition mill, 50 HP
- 1 — Worthington 75 cu ft. rot. batch blender
- 1 — Raymond 66" 6-roll mill, rebuilt.
- 1 — Raymond 50" 5-roller hi-side mill, rebuilt
- 3 — National 10' x 78" rotary dryers, 3/4" shell.
- 2 — Hardinge 8'-8" x 70' rot. dryers, 5/8" welded.
- 2 — Davenport 8' x 60' rot. dryers, 7/16" welded.
- 1 — 7'-6" x 62' rotary cooler, 1/2" welded.
- 1 — Louisville 6' x 50' steam-tube dryer.
- 1 — Louisville 4'-6" x 25' steam-tube dryer.
- 2 — 18,000 gal. vert. alum. tanks.

LARGEST STOCK OF ROTARY DRYERS & COOLERS
SEND FOR CIRCULAR #860-A

LIQUIDATION

OMAHA, NEBRASKA

- 1 — Prater Blue-Streak mill, size #20
- 8 — Forster hammermills, size #8, 6
- 4 — Davenport #2A dewatering presses
- 12 — Buflovak 42" x 120" dbl. drum dryers
- 3 — Shriver 48" C. I. filter presses, 50 ch.
- 2 — Allis-Chalmers Inter-plane grinders
- 8 — Allis-Chalmers degerminators

SEND FOR DETAILED CIRCULAR

PERRY EQUIPMENT CORPORATION
1426 N. 6th St., Phila. 22, Pa.
POplar 3-3505

**A complete survey of the
chemical fertilizer industry . . .**

The CHEMISTRY and TECHNOLOGY of FERTILIZERS

Edited by **VINCENT SAUCHELLI**, Chemical
Technologist, National Plant Food Institute.

ACS Monograph, 1960, 704 pages, \$18.00

Leading authorities in the field discuss the raw materials used in chemical fertilizers and the conversion of these materials to suitable chemical compounds for the feeding of crop plants.

Among the topics discussed are the factors controlling the preparation of conventional mixed fertilizers, the caking problem, the theory and practice of drying and cooling fertilizers, liquid fertilizers, and corrosion and methods of preventing it in the manufacturing process. Extensive coverage is given to phosphate ore, its mining and processing. In addition, the authors discuss nitrogen compounds, potash salts and granulated fertilizers. The book also includes a detailed description of the processing equipment used in a modern plant.

Broad in scope, accurate, completely up-to-date, this book will be of special value to chemists, chemical engineers, plant superintendents, and to management charged with the responsibility of selecting efficient and economical processes for the production of fertilizers.

CONTENTS: The fertilizer industry of the United States; Nitrogen; Phosphate Ore; Phosphate Rock; Normal Superphosphate; Manufacture of Triple Superphosphates; Wet-Phosphate Acid Manufacture; Diammonium Phosphate as Produced at By-Product Coke-Oven Plants; Operating Techniques, Equipment and Practices in Manufacture of Granular Mixed Fertilizers; Manufacture of Concentrated Water; Nitrophosphates and Miscellaneous Phosphates; Thermal Process for Producing Phosphate Fertilizers; Potash Occurrences, Processes, Production; Plan Practices in the Manufacture of Nongranulated Mixed Fertilizers; Minor and Secondary Elements in Mixed Fertilizers; Caking of Mixed Fertilizers; Fertilizer Materials; Liquid Fertilizers; Structural and X-Ray Data on Chemical Compounds Found in Fertilizers; Corrosion; Materials of Construction for Fertilizer Plants and Phosphoric Acid Service; Materials; Gaseous Effluence for Fertilizer Granulation Plants.

Send your order NOW to:

COMMERCIAL FERTILIZER
75 Third Street, N.W., Atlanta 8, Georgia

INDEX TO ADVERTISERS

Abbe Engineering Company, Kent Mill Division	Front Cover, 19-22
Allied Chemical Corp., Nitrogen Division	9
American Agricultural Chemical Company, The	33
American Cyanamid Company, Agricultural Division	66
American-Marietta Company	5
American Potash & Chemical Corporation	10
Armour Agricultural Chemical Company	14, Back Cover
Ashcraft-Wilkinson Company	60
Atlanta Utility Works	
B-I-F Industries, Inc.	
Barnes Manufacturing Company	8
Bemis Bro. Bag Co.	
Blaw-Knox Company, Equipment Division	65
Burlap Council, The	
California Chemical Co., Ortho Div.	
Chain Belt Company	6
Chase Bag Company	
Central Resources Corporation	70
Chemical & Industrial Corporation, The	17
Combustion Engineering, Inc., Raymond Division	53
Commercial Solvents Corporation, Agricultural Chemicals Dept.	
Compudyno Corporation	71
Continental Conveyor & Equipment Company	54
Crouch, Newton	
Crown Manufacturing Company	
Davison Chemical Division, W. R. Grace & Company	
Deere Chemical Company, John	
Dorr-Oliver Inc.	47
Duval Sulphur and Potash Company	14
Elano Corporation	74
Escambia Chemical Corporation	
Ferro Corporation	37
Fertilizer Engineering & Equipment Company	
Fertilizer Equipment Sales Corporation	74
Fibercast Company	55
Finco, Inc.,	63
General American Transportation Corporation	50
Gilman Paper Company	Inside Front Cover
Grace & Company (W.R.), Davison Chemical Division	
Inglott Development & Engineering Associates, Inc.	35
International Minerals & Chemical Corporation, Agricultural Chemicals Division	39-40
International Ore & Fertilizer Corporation	23
International Paper Company, Bagpak Division	
Kennedy Car Liner & Bag Company, Inc.	
Kent Mill Division, Abbe Engineering Company	Inside Front Cover
Kraft Bag Div., St. Marys Kraft Corp.	
Law & Company	73
Lely Ltd.	67
Louisville Dryers	50
Marietta Concrete Division	66
National Lime and Stone Company, The	
Omega Feeders	
Perry Equipment Corporation	73
Phelps Dodge Refining Corporation	
Phillips Chemical Company	74
Planters Fertilizer & Phosphate Company	18
Potash Company of America	
Raymond Bag Corporation	
Raymond Division, Combustion Engineering, Inc.	53
Sackett and Sons Company, The A. J.	27
St. Regis Paper Company, Bag Division	
Shuey & Company, Inc.	72
Sohio Chemical Company	7
Southwest Potash Corporation	11
Spencer Chemical Company	
Stedman Foundry & Machine Company, Inc.	66
Sturtevant Mill Company	31
Swift and Company	
Tamms Industries Company	63
Tennessee Corporation	41
Texaco Inc.	16
Texas Gulf Sulphur Company	Inside Back Cover
Thomas Alabama Kaolin Company, The	67, 72
Tryco Manufacturing Company, Inc.	61
Tyler Manufacturing Company	62
Union Bag-Camp Paper Corporation	15
United States Borax & Chemical Corporation	3
U. S. Phosphoric Products Division, Tennessee Corporation	12-13
Weighing & Controls, Inc.	71
Wendnagel & Company, Inc.	
West Virginia Pulp & Paper Company	45
Wiley & Company, Inc.	72
Youngstown Sheet & Tube Company	55

1. SOIL TESTING 2. PLANT FEEDING

Made easy with this



HOFFER SOIL SAMPLER

Agronomists are saving time, money... are improving results with this economical easy to use tool.



IN SOIL TESTING

Produces true soil profiles at various levels without distortion... cuts soil core slightly smaller than the tube... core rises in tube without breakage.

IN FERTILIZING PLANTS—TREES

Removes core of sod 1" in diameter to depth of 16" into root system. Fertilizer placed in hole encourages better, deeper root growth and healthier plants.

The Hoffer Soil Sampler is heat treated, triple plated, to resist rust, easy to use and clean. Send order today or write for descriptive literature. Only \$3.95 each. Discounts for quantity orders.

ELANO CORP. XENIA, OHIO

Planters Fertilizer & Phosphate Co.

Manufacturers of

Sulphuric Acid, Superphosphate, Ammoniated
Superphosphate Base, Mixed Goods.
HIGH GRADE GRANULAR FERTILIZERS

CHARLESTON HEIGHTS, S. C.

Box 4857

Serving the

FERTILIZER INDUSTRY

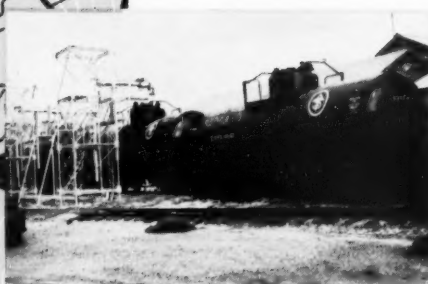
Fertilizer Equipment Sales Corp.

Designers — Engineers — Manufacturers of
Fertilizer Machinery

Sales and engineering office:
6295 Pleasantdale Drive
Doraville, Ga.
P. O. Box 9755
Atlanta 19, Ga.
Phone GLendale 7-0286

molten sulphur

SHORT HAULS—PROMPT DELIVERIES



Beaumont, Texas is the shipping point for practically all the TGS tonnage of molten sulphur sent to the eastern half of the United States. *BUT* instead of waiting for deliveries measured in days TGS customers can rely upon these four regional terminals and get their supplies in much faster time.

Cincinnati, Ohio

Tampa, Florida

Norfolk, Virginia

Carteret, New Jersey

At each of these terminals, we maintain inventories of thousands of tons of molten sulphur, ready for prompt deliveries by tank car and tank truck. It would be an unusual demand that would necessitate time-consuming 'Beaumont to customer' delivery.

This is service with a capital S. These terminals are part of a steadily expanding TGS program of shortening Sulphur supply lines.



TEXAS GULF SULPHUR COMPANY

75 East 45th Street, New York 17, N. Y.
811 Rusk Avenue, Houston 2, Texas

Sulphur Producing Units: Newgulf, Texas • Moss Bluff, Texas
• Fannett, Texas • Spindletop, Texas • Worland, Wyoming
• Okotoks, Alberta, Canada



Your one stop service for

Agricultural and Industrial Chemicals

- **NITROGEN**
- **POTASH**
- **SULPHUR**
- **ORGANICS**
- **FOREIGN AND DOMESTIC
FERTILIZER MATERIALS**

Exclusive Sales Agents for

Duval Sulphur & Potash Company

Escambia Chemical Corporation

ASHCRAFT-WILKINSON COMPANY

HOME OFFICE • ATLANTA, GEORGIA

BRANCH OFFICES:

NORFOLK, VA. • CHARLESTON, S. C. • TAMPA, FLA. • JACKSON, MISS.
COLUMBUS, OHIO • MONTGOMERY, ALA. • DES MOINES, IOWA

